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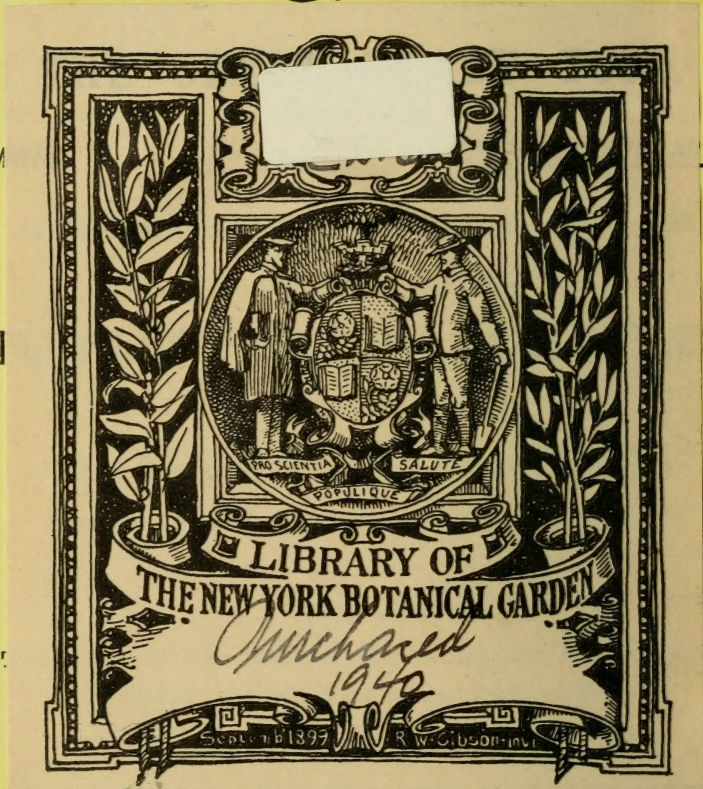

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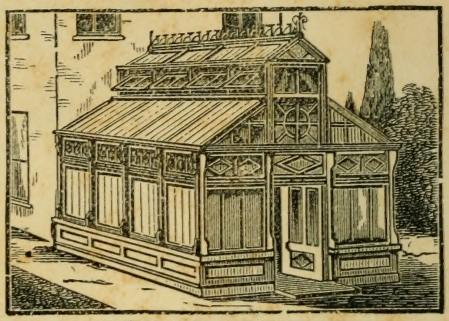

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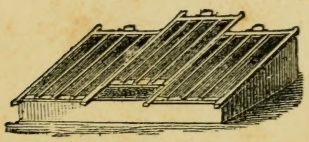

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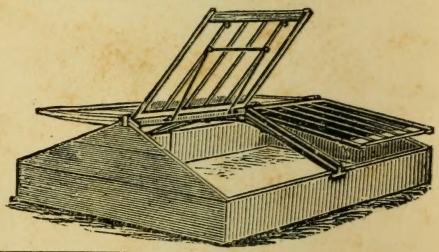

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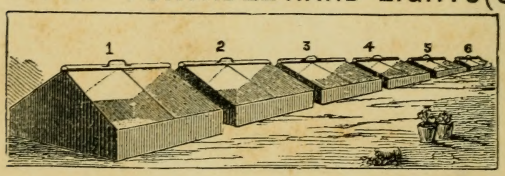

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THE CARNATION MANUAL.

THE CARNATION MANUAL.

EDITED AND ISSUED BY

THE NATIONAL CARNATION AND PICOTEE SOCIETY.

(SOUTHERN SECTION.)

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PREFACE.

The Committee of the National Carnation and Picotee Society (Southern Section) feel that no apology is needed for the issue of this little Manual upon the cultivation of the Carnation, the improvement and development of which is the sole purpose of their incorporation.

They are aware that other works of much authority and literary value have been published on the same subject, but they believe that in none has the general information required by the amateur been presented in so simple and useful a form as in the present work. In it will be found papers from some of the most successful growers of the day, detailing the methods pursued by them from the first impregnation of the seed-pod to the final staging of the flowers upon the Exhibition tables.

The Committee trust that the information given will go far to remove the impression now generally held that the cultivation of the Carnation presents unusual difficulties. It will be seen that this is not the case, and that attention

to certain simple rules and methods is alone requisite to ensure success.

It may be that occasional divergencies of opinion may be found in the papers now submitted to the public, and the Committee desire it to be understood that although as Editors of this Manual they hold themselves responsible for the general utility of the information given in its pages, they have not interfered with the free expression of individual opinions, where these do not tend to introduce erroneous views upon the main principles of culture.

The great increase of notice and popularity which has been of late years bestowed upon these flowers encourages the Committee to anticipate a rapid development of the beauty, variety, and hardiness of its many forms, and to this end they are extremely anxious to encourage the raising of seedling plants.

They have received from some of their supporters promises of surplus seed, which they propose distributing among such of their members (subscribers of 10s. and upwards) who will undertake to raise plants from it. If the number of applicants is in excess of the seed at their disposal, the distribution will be made by ballot.

The attention of the Society was for many years, after its inauguration in 1876, mainly directed towards the improvement and encourage-

ment of what have been termed "florists' flowers," but an ever-increasing interest has lately been shown in the cultivation of border varieties of the plant, and the Committee are therefore glad to be able to announce that the prizes for "border varieties," offered by a Member of the Society for the first time last summer, will be continued for some years to come.

This Manual will be sent free to all Members of the Society subscribing annually 10s. or upwards: and will be sold to Members subscribing annually 5s. at half the price at which it will be offered to the general public.

The privileges of Membership will also include free entry to the Exhibitions of the Society, and free transferable passes in proportion to the amount of the subscription.

MARTIN R. SMITH,
President.

JAMES DOUGLAS,
Hon. Secretary.

INTRODUCTION.

By the Rev. F. D. Horner, M.A.

As the figurehead is to a ship, so perhaps is the introduction to a book.

In relation to this volume, now committed to its native element the public, I occupy much the same position as one of those graven images which, I fear, since the introduction of iron shipbuilding, have greatly fallen off; being much reduced from former grandeur, and in that air of profound confidence in themselves and supreme self-importance which, when a boy, I highly admired in them as they lay awaiting their next voyage in the docks of my native seaport town.

Figureheads have varied very much in artistic taste and finish; and, where they were of human aspect, have generally expressed much decision of character, and a wooden-headed firmness of purpose. When they did not, they went to the other extreme, and had no character at all.

If not valiant, they were vapid; if not intellectual, they were grossly ignorant!

Sometimes a figurehead would seem to personify the feminine beauty of the tall, fair ship

herself, or be suggestive of the enterprise of her owner, or the prowess of her captain and his crew. Frequently it was the idolatrous image of some mythological sea-god or goddess, or of nothing more exalted in marine rank and title than a common mermaid, or a low-born Triton, professing to play soul-stirring music out of a sea-shell that could not possibly have many notes in it, nor those few sweet.

How I did delight in those wooden figure-heads, that went to sea with one set smile for calm and storm; that through day and night, for weeks and months, would beckon across wide wastes of waters to something that they never sighted, or make warlike gestures at a foe they never met!

It was very interesting, too, to find a figure-head come home that I knew had gone to sea newly got up, or in fresh war-paint. It had a travel-worn, washed-out, sea-sick look about it that appealed powerfully to the feelings of a sympathetic boy!

When figureheads were "dismissed the Service," or were retired as being no longer able-bodied, or had lost a limb at sea—for some of them were above having a sham wooden leg or arm—they used to appear in the suburban allotment gardens of small sea-captains, and there spend their declining years at the foot of mimic masts

"stepped" in the garden ground, or at the corners of small rustic cabins, or as castaways on suggestive rockwork: but still ever beckoning to the friend that never hove in sight, or brandishing a cutlass at the enemy that never came.

In whatsoever guise our readers may regard me under this figure of a figurehead, my own opinion is that, as the effigy at the ship's prow is not of much importance in the navigation of the vessel, so neither shall I add much here to the sailing powers of the ship—I mean book.

If I say I hope it will "catch on," I do not mean on rocks of iron-bound criticism. If I express the wish that it may "go down" with the public, I do not mean to the bottom, "with all hands" that had a share in it.

However, in being practically acquainted with the culture of the Carnation and Picotee in their highest—that is, in their florist types—my figurehead position has so far a fitness that, as an old grower of these flowers, I may symbolise the intent and enterprise of the book.

So would I raise a beckoning hand to those lovers of flowers whom I may never see, and who to this fair, sweet flower are "strangers yet"; while to hostile critics, whom I hope never to hear of, I would hold the challenge ready to go and do the work more thoroughly if they can themselves.

To florist specialists I think this book, beyond

its title and the names that vouch for its contents, scarce needs an introduction from me; and so my words may seem to them but a mere, though I hope not a cold, formality.

For the manner of florists is to read eagerly anything that concerns a favourite flower. The matter may not always be new, but novelty is not essential to truth. To some it may come as a very "old, old story," yet loving interest in the plant gives touch and bloom of freshness to all that can be said about it. I dare say that, in other lines and walks of love, it is given to but few "lovers" to rise much, if ever, above the stereotyped and commonplace, except in each other's estimation. Many a love tale transparently fails to do so, and yet we have read such tales with an interest which they never exhaust, though we "knew what the end would be." Perchance we have told one such tale ourselves, evolved out of our own inner consciousness, as if the subject were fresh as the day's rosebud, and no expert but ourselves had ever demonstrated it before!

If I know a florist's love for his flowers—and I think I do, passionately—I feel sure that this little work will be read with interest by "old hands"; and I trust many a beginner will be successfully guided and encouraged by it.

It is, alas! too much to expect that every novice will make an expert, or even "go on." Some will

"damp off" as being constitutionally weak of purpose, short of application. "Infant mortality" among new-born enthusiasts is a feature in the records of all our florist societies, and our treasurers are the registrars of these early deaths.

In the retrospect of a long florist life, such as mine has well-nigh grown to be, I can see, amid grey memorials of many a veteran florist, the tiny footstones, as it were, of those who, though perhaps still living men, have yet as florists "died in their infancy." Not as lying here, shall we count those whose love for favourite flowers has outlived their powers to tend them; or who, in the chances and changes of life, have no longer either time or garden space available. We look on men like these as with us yet; and times come round with flowers, and old friends meet over old favourites, and we feel we are not parted.

Of course, in the routine of culture here laid down no one will expect to find, with respect to a flower long known and successfully grown, a new scheme of short cuts and royal roads to success. The well-trodden way will be pointed out, and there will be the experiences of men who have great difficulties and disadvantages of locality to contend with, and who have proved that love, if only it lasts, can conquer all but the impossible, and a great deal of that which at first and at a distance seemed no less.

The history of the Carnation's origin and development to its present many forms, so far as this can be traced, together with the latest information from those conversant with the flower, whether as a "florists' flower," or border plant, or perpetual-flowering "Tree" Carnation, as well as the best methods of producing, protecting, and exhibiting its blooms, so that each flower shall display its whole beauty at a glance, which by the very habit of its petals it will not do, because one may easily and often conceal several that are underneath it—all these matters are so many points of interest and importance which it is sought to gather together in this volume.

Florists' flowers are like ourselves in this, that while we shall ever see in them some quality that will grow stronger, clearer, truer by practice—*i.e.*, by cultivation—so there is always room likewise for improvement in the quality of our knowledge on the same principle.

The man who, in any pursuit, contents himself with the degree of knowledge which he has, is, in floricultural terms, an "old variety" man, and is taking the nearest road to defeat.

"Genius," that large, bright word—that inborn varied gift and power to be great—we almost certainly have not. But genius has been cleverly defined as "the capacity for taking infinite pains"—a definition warranted from the examples of

those who by dint of that capacity have become great without genius as a birth-gift.

It is surprising what sparks, nearly as bright as genius, may be struck out by the plain flint-and-steel of persevering, unwearied effort: and I think that all the contributors to this book will have written thus carefully and minutely in their respective departments, in the hope that their work may meet with many students in whom they could wish for no more hopeful sign than this—"The capacity for taking infinite pains."

Burton-in-Lonsdale, 1892.

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THE CARNATION MANUAL.

CARNATION SEED AND SEEDLINGS.

By J. Douglas.

Perhaps the most interesting detail in the cultivation of the Carnation is the raising of seedlings: interesting on account of its many failures, its unexpected successes, and the variety of useful and singular experiences which it affords.

I have given much attention to the subject for many years past, and, in the hope that my experience may be of service to the readers of this manual, I venture to set before them the methods I have pursued.

I do so in the hope that I may be able to induce amateurs to become seedling raisers, feeling sure that no one who once enters upon the work will readily relinquish it.

No lover of Carnations has any conception of the interest these flowers are able to afford until he has learnt to look forward every year to the flowering of his batch of seedlings.

Seed.—The interest of raising seedlings is much enhanced if the grower is able to sow seed

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which he has himself fertilised and harvested; but as many persons may be unable to save their own seed—for securing which, in this climate, "glass" may be considered a necessity—it is a matter of much importance that seed be purchased from a dealer who has a good name to sustain, or from a nurseryman who cultivates only the best varieties.

There are many classes of Carnations and Picotees, but, as I take for granted that everyone who contemplates the raising of seedlings has given attention to this part of his subject, and has thoroughly made up his mind in which class he will seek for new varieties, I will not mention them in detail.

If he has not made up his mind, it is most important that he should do so before commencing operations, for success is not likely to follow mere indiscriminate crossing.

That I may be clearly understood, I will give the method that I should pursue if I desired to raise a new and improved variety of the "scarlet bizarre" class. I should select two of the very best at present in cultivation, say, "Admiral Curzon" (Easom) for a pollen-bearer, and for the seed-parent "Robert Houlgrave" (Barlow), and should put a few flowering plants of each variety in a cool, airy greenhouse, where the plants would have full sunshine. These plants I should not disbud, but

leave them to bear as many flowers as they liked.

In the same way, did I want to raise new varieties of the purple flake, I should probably select "James Douglas" to cross with "Florence Nightingale," because, though both "purple flakes," the shades are distinct.

Or in the Picotee class I might try "Brunette" (Kirtland) with "John Smith," both heavy-edged reds, but of distinct tints.

This method should be pursued all through the various classes. The self colours might be greatly improved by selecting some of the best rose or scarlet shades, and crossing them—not rose with scarlet, but rose with rose, and scarlet with scarlet—bearing in mind that the seed-bearer should always be a plant of vigorous habit and compact growth.

Flowers that have too many petals, and which therefore burst their calyx, should never be selected as parents. Have nothing to do with flowers with short, stumpy calyces crowded with small petals; by mere force of expansion the calyx bursts from top to bottom, and the petals fall out, forming a woeful spectacle to the lover of symmetrically formed flowers.

Choose rather flowers which have a long, firm calyx; they should be of large size and good form. The petals should be firm and solid in texture—not

"flimsy"—broad and slightly cupped, for reflexed petals rarely form a good flower.

It would be well that the beginner should confine his attention to one or two classes each year. I am of opinion that he will then gain a more solid experience and probably better results.

So much for selection.

Some growers insist on the necessity of covering the plants with gauze, or nailing gauze or stuff of a similar nature over the ventilators and window-openings of the house to keep the bees out, and to prevent the plants from becoming fertilised by them with pollen brought from the outside.

I can understand the grounds upon which this precaution is taken, but am bound to say that the success which I have been fortunate enough to obtain does not lead me to attach much importance to it. It may, however, be a useful precaution to adopt where there are other Carnations in the immediate vicinity.

A few words may here be useful to beginners upon the organs of the plant used for the production and fertilisation of seed.

The pistils are in the form of two or sometimes three horn-shaped processes, called "styles," which spring from the apex of the seed-pod—that is, from the very centre of the flower—and rapidly grow as the bloom expands, until, when ready for impregnation, their ends will be found somewhat

curled, and their surface slightly rough with a very delicate down.

Until these pistils are what gardeners would call "well up" they are not ready for the pollen.

This pollen is found in the anthers, which are tiny oval-shaped cups, slightly attached to very delicate filaments, the stamens, and must be looked for among the petals of the bloom.

The pollen is found on, or perhaps we should say *in*, these anthers, in the form of a fine dust, which can readily be removed from them on the point of a camel's-hair brush.

Sometimes, and with some varieties, this pollen is difficult to obtain—the anthers are there, but wholly destitute of pollen. Occasionally, also, especially in dark, damp weather, it is found in a clammy, lumpy state, in which condition it is of no use to the operator.

The auspicious moment is near mid-day in fine, bright weather, when the pollen should be found in the proper condition, viz., that of an exceedingly fine, light dust.

The process of fertilisation is very simple. The operator, with the point of a camel's-hair brush, removes a small portion of the pollen, and touches with it the points and upper ends of the pistils of the bloom he wishes to fertilise.

An incredibly small quantity is needed; it is essentially *quality* not *quantity* that is required.

As soon as this is done, it is well, if there are many varieties in the house, to attach a label to the bloom fertilised, stating from what plant the pollen was taken.

As fertilisation does not by any means always ensue, it is necessary that the operator should daily visit his flowers, and where required repeat the process. The condition of the bloom itself will show whether it is necessary or not. If it has been successfully fertilised on the previous day, it will already have begun to shrink and droop its petals, but if still in full beauty the operation should be repeated.

When the flowers are completely dead after impregnation, and the petals shrivelled and dry, they should be pulled out of the calyx to admit air to the seed-pod. Care must be taken not to pull away with them the pistils, which, as we have seen, spring from the apex of the seed-pod. These should be left intact.

I need hardly say that the earlier in the season the flowers are impregnated the better, as they get the advantage of the long, bright days, and have every chance of properly maturing their seed. They also escape the danger, which is very real in late autumn, of the seed-pods damping off at the base. This tendency, which is much more marked in some varieties than others, may be partially met by splitting down the calyx in two or three places,

thus allowing the air to get to the base of the seed-pod. If the calyx dies, as it often does, it may with advantage be cut away, thus leaving the seed-pod completely exposed to the air.

If the autumn be cold and damp, and the plants appear unequal to the proper ripening of their seed, they may be roused to renewed activity by putting them into a warmer atmosphere than that of the Carnation-house.

The seed may be expected to ripen about the end of September, evidence of the fact being given by the seed-pods assuming a brownish tint and opening slightly at the apex.

The seeds, when thoroughly ripe, are usually black in colour, but sometimes the entire pod of seeds will be of a creamy white, and these are as good as the black ones.

When gathered, the seed-pods should be spread out in an airy place on sheets of clean paper to thoroughly dry, and when in this condition the seed may be readily separated from the pods.

Great care should be taken to label every batch of seed with the names of the parents. The memory alone must under no circumstances be relied on.

But, when all is done, the cultivator must not suppose that, although he may have taken infinite pains to raise his seed from the best varieties, he will necessarily reap a rich harvest of fine flowers,

or that any large proportion of the seedling plants will be as good as their parents, or resemble them in any marked manner. The experience of all the best growers of seedlings proves that any such expectation is doomed to disappointment.

My own experience, founded upon many years' observation, gives me something like the following averages.

In 100 plants, raised from the best strains, I should expect about 12 to 15 per cent. to be single and worthless.

Seventy or eighty per cent., or perhaps more, would probably give me double flowers of one sort or another, some little better than singles, others with a mass of small, badly-shaped petals, but none of them showing any marked superiority over existing varieties; and I should be well content if I got 5 or 6 per cent. worth growing again, to test not only their value as good and distinct varieties, but also whether they are vigorous enough to grow freely in the open border. If they fail in this latter requirement, they are not worth preserving.

Perhaps some would-be raisers may be a little disheartened by this chronicle of my experience. But the exquisite beauty and variety of colour of the great proportion of the seedlings are alone a sufficient reward. They may not be new varieties, nor be perfect florists' flowers, but they will furnish

a profusion of lovely bloom, and neighbours will gratefully carry away and cherish many of the plants which he himself may not care to grow.

Another source of interest, and perhaps disappointment, will be found in the very great variations of colour presented by seedlings raised from the same parents, and which occur to an extent that is truly surprising.

Desirous of obtaining a few good, light-edged, purple Picotees, I crossed for this purpose "Her Majesty" (Addis) with "Nymph" (Lord).

From a batch of about five hundred seedlings from this cross I obtained only one light-edged Picotee worth growing again, and it is now in cultivation under the name of Silvia. What was my surprise, however, to find among the seedlings an unusual number of purple selfs, of different shades of colour, and one of them is now widely grown under the name of "Purple Emperor."

Now in this case the parents had pure *white* grounds, the only purple about them being a thin wire-like edging to each petal; and equally curious is the fact that there was not a single white self flower among the seedlings.

I have raised thousands of seedlings, and could write much on the curious variations of colour observable in seedlings from white ground Carnations and Picotees, as they are endless and unaccountable; but as I can lay down no methods by

which they can be regulated, and suggest no processes by which they can be affected, I must leave amateurs to gain their own experience in this field of Flora's fair domain.

Nature and art combined will provide for the patient worker an inexhaustible series of wonders beyond my poor pen to describe.

Before leaving this part of my subject, however, I must give a few details of my experience with the pure "yellow ground" Picotees.

The Yellow Carnation and Picotee are doubtless accidental productions from the white ground varieties. (See separate Chapter on Yellow Carnation and Picotees.)

Seedlings raised from them revert back to the white ground, but we never get yellow ground varieties from our white ground seedlings. Such, at least, is my experience—extending now over many years.

From about six hundred plants, flowered in one year from the best yellow ground Picotees, I was greatly surprised to find a large number with white grounds; many deep rose, rosy red, maroon and scarlet selfs—two of them are now in cultivation as "King of Scarlets" and "Ruby."

I was also told by a friend the other day that last year he saw a large bed of seedlings entirely raised from the yellow variety "Pride of Penshurst," and it presented every shade of colour but

yellow. Out of some three hundred plants there was but one with yellow flowers, and that was worthless!

Sowing the Seed.—This should be done about the end of March or early in April. For this purpose prepare flower-pots or pans of fine soil, having a hotbed prepared in good condition to receive them. The pots or pans should be plunged in a rather brisk bottom-heat, up to their rims; the seeds are sown in rather damp soil, and in good heat will vegetate in a week. They may be burned up by over-heating. I never water the seed-pans. The atmosphere and moist soil is enough for the young plants, as they are pricked out into boxes as soon as the seed-leaves have grown to their full size. If the young seedlings are watered in the atmosphere of a hot-bed they are apt to rot off at the neck. I allow about three inches between each plant when pricking them out; and the boxes should remain in the frames until the young plants are established, gradually inuring them to more air. In three weeks after they have been pricked out in the boxes they will be strong enough to be placed in cold frames; and by the first week in May, if the weather is fine, the frame-lights may be removed entirely, and by the end of that month be planted out where they are to flower. I choose an open position, where the ground has been trenched

to the depth of about eighteen inches, and cultivated for some years, so that the mould is in a friable, open condition. A good dressing of farmyard manure should be added to it; but the manure ought not to be placed in immediate contact with the roots. If the soil at the top is a heavy, sticky clay, the plants will not take kindly to it, unless the following precautions are taken: Take of good fibrous loam three parts, leaf-mould one part, decayed manure one part, and one part coarse sand; mix the whole well up together, and place a handful or so around the roots of each plant to give them a start. If the young plants are taken carefully out of the boxes with all the roots and soil attached, they will start away freely without any check, and, of course, they must have been gradually inured to the open air before being planted out. Given good soil to grow in, and the plants in good condition, the ground stirred up by the Dutch hoe to kill weeds, they will make large specimens by the end of the season, and produce such a superabundance of flowers the year following as to be almost beyond belief. I have counted upwards of two hundred flowers on one of these seedling plants. It is a daily pleasure at flowering time, in July and August, for the amateur to visit his bed of seedling Carnations, watching the development of the flowers, and carefully noting those that will have to be propagated for flowering next

season. I have layered them in two ways: one is to take up the plants in August, plant them in flower-pots, and layer them into the pots; the other, and I fancy the better, way is to layer them where they flower: in that case the ground will not be available for any other purpose until after the young plants are removed in October. If the ground is wanted in August, or before the layers have formed roots, it will be necessary to pot the plants up before layering.

PROPAGATION OF THE CARNATION.

By R. Dean.

The propagation of the Carnation is secured by two methods: by means of pipings or cuttings, and by layers. Seed cannot be depended upon to reproduce exactly the particular variety which yields the seed grains.

By Pipings or Cuttings.—These can be made as soon as the grass has grown long enough, say in July, or when layering; the small shoots which are too high up on the plant to layer in the ordinary way can be struck as cuttings, or such shoots as snap off in the act of pegging them down into the soil when layering them.

Soil.—The best compost for cuttings is a good yellow loam, thoroughly decomposed leaf-soil, and silver sand, in equal quantities, but passed through a fine sieve before using.

Striking.—The quickest and most ready mode of striking cuttings is by placing the pots on a gentle bottom-heat, such as that produced by an ordinary dung-bed. Ordinary hand-lights should be placed over a group of pots, or a small bell-glass over each pot; this is an important condition in securing rooted plants quickly and thoroughly.

Cool Treatment.—Those who cannot avail themselves of bottom-heat must strike under cool treatment. The best way to proceed is to prepare some fine soil, as recommended above, and make a bed of it on a shady border, if possible on a spot raised above the ordinary ground-level. Put the cuttings in this bed when it is made thoroughly firm, give them a good sprinkling by means of a rose watering-pot, place a hand-glass over them, leaving it on until the cuttings show signs of growth. Occasional sprinklings of the cuttings will be necessary according to the dryness of the weather; and some shade over the hand-glass will be requisite when the sun shines brightly.

It may be asked—Do rooted cuttings make such good flowering plants as layers? and will they bloom so early? To these questions the reply is—Strong pipings or cuttings make fine plants, but they are generally later in flowering than plants obtained from layers.

Layering.—August is the month in which to layer Carnations; the shoots have become firm, and can be manipulated without danger of snapping off. The first process is to trim the layers, using a pair of sharp scissors, cutting away the leaves close to the stem up to about the fourth or fifth joint from the point. Then, by means of a pointed stake, take out from the pot two inches or so of the old soil, and replace it with new,

something after the nature of that recommended for cuttings. Should the soil about the roots be dry, give a good soaking of water, and allow it to drain away before filling the pot with fresh soil. The new compost should be raised up to the level of the rim, but pressed somewhat firmly as the work of filling proceeds. Pegs are necessary to fasten the layers securely down into the soil. Those made of fern are usually employed; it is also possible to obtain pegs made of flexible wire: and these, being much more durable, are cheapest in the end. Then the layerer, taking the trimmed shoot firmly between the thumb and forefinger of his left hand, thrusts his knife, the blade of which should be small, narrow, and sharpened on both sides, through the third or fourth joint, bringing it out at the back by means of a clean and rapid cut; the tongue of the layer is shortened, if necessary, it is then pressed gently down into the fresh soil, and secured by means of a peg. When the whole of the layers are laid down—and they generally are made to form a fringe round the inner rim of the pot—the surface soil should be levelled off and the surface made neat.

Some shoots are too high up on the plant to be able to bend them low enough to layer in the ordinary way. A zinc rim, two or three inches in depth, can be fitted to the pots, filled with soil,

and by this means it is brought nearer to the level of the layers.

When all is completed, a light sprinkling overhead should be given by means of a rose watering-pot, and the pots stood out in the open until the layers have rooted, which, in a good season, will happen in from a month to six weeks.

By the end of September, and during the first two weeks in October, the layers will be sufficiently rooted to admit of potting off. But this process is dealt with by others, and I will not trench farther upon their allotted tasks.

BORDER CARNATIONS.

By MARTIN R. SMITH.

Selection of Varieties.—This is the first matter which must engage the amateur's attention, for he will meet with much disappointment if he endeavours to grow all varieties indiscriminately in the open border. It is often asserted that "all Carnations are hardy," and if by this is meant that they will all stand a certain amount of frost, snow, and cutting wind, no doubt the assertion is true; but it is also a fact that, although almost all varieties will struggle through great vicissitudes of weather, there are only a certain number that will really thrive and flower freely in spite of such untoward conditions. Many of the yellow ground varieties, for instance, do not show to advantage in the open border. At least, such is my experience at Hayes, in Kent.

Perhaps "selfs," *i.e.*, Carnations of one colour, may, as a class, be considered the fittest occupants of the border. As a rule they are very hardy and free, and the mass of colour they present when in full flower is most effective.

No lover of Carnations, however, will be satisfied to grow one class alone of these lovely flowers, and,

indeed, there is no reason why he should do so. There are varieties in every class—selfs, bizarres, flakes, fancies, and picotees—which will do well out of doors. There are, however, certain points to be considered in their selection.

The first, and certainly one of the most important, is that no plant which habitually bursts its calyx is worth growing at all in the open border.

It must, however, be remembered that nearly *all* Carnations have this tendency, and will at times produce untidy flowers with a burst calyx, and in some seasons this habit is much more observable than in others. It is well to remember, however, that plants which display this fault in the open border may lose it to some extent under pot culture. No promising seedling, therefore, should be finally discarded until it has been proved under both conditions.

The formation of the buds, however, furnishes a rule by which Carnations may be roughly divided into two great classes—Bursters and Non-bursters.

The confirmed "burster" will always have short, round, blunt-headed buds; such plants *never* give satisfactory results in the border, and will seldom produce a flower which is worth the trouble of picking. The non-burster, on the other hand, displays a long bud of about three times its diameter, and these alone deserve to be classed as "Border Carnations."

Another point of importance is to give the preference to those varieties which experience has proved to be suitable to the soil and climate of the district; the advice of local growers will certainly be of much assistance in this respect. It is a common saying, "Such and such a plant is a lovely variety, *but it does not do with me;*' and though it may be well that all and every variety of Carnation (which does not burst its calyx) should be tried in the open border, the grower must not be disappointed if he finds that they will not all thrive in *his* garden. Experience alone must be his guide in this matter.

Again, he should select somewhat dwarf varieties; they are altogether neater and more effective than tall straggling plants. "Tree" or perpetual flowering Carnations will, most of them, do well enough in the border, but they are out of place there, and the summer flowering varieties, with an average growth of from twenty to thirty inches, will be found much more suitable.

He should also look to it that they be of "vigorous habit," that is, that they should throw up plenty of strong grass. It is, unfortunately, the case that many of the most beautiful varieties fall sadly short of this requirement, and such should be relegated to the greenhouse. It is unsatisfactory work attempting to grow in the open border plants

which have earned for themselves the reputation of being weakly growers.

Further, the varieties selected should be of "erect" habit, that is, their flower stems should be strong enough to carry the blooms without drooping their heads. This is an important requirement in a border Carnation, for if nothing but the back of the flower is visible, not only is there much loss of effect, but to form an opinion of colour, shape, and petal it becomes necessary to stoop and turn up every bloom.

Finally, they should be "free flowering," that is, that they should throw up several flower stems, and cover them well with buds.

The Border.—The next point to be considered is the selection and formation of the border.

Carnations require space, light, and fresh air, and should have the border practically to themselves; they cannot thrive in the interstices of an ordinary garden border, half full of herbaceous plants and annuals. If, however, there is no other place for them, care must be taken to secure them from encroachment as the other plants begin to grow, for they resent being crowded and overshadowed.

They will certainly do far better in a border of their own. Select it, if possible, facing towards the south, for they cannot have too much sun. If protection by shrubs can be given to the north and

east so much the better; but the shrubs must be well back from the plants, and there must be no sense of confinement about the border. What is called a sheltered, "snug" corner will probably be about the worst place that could be selected.

"Snugness" is the very thing that is *not* wanted. They cannot have too much air. They may very easily have too little.

It will be found convenient that the border should be narrow, *i.e.*, of such a width that all the plants in it can be easily got at, and the operations of staking and tying, disbudding, layering, &c., conducted without being obliged to step upon it. It should also be raised, for drainage purposes, eight inches or so above the surrounding level.

As a preliminary it must be well and deeply trenched.

The Soil.—Carnations will grow and flower more or less in any and every soil, but they can only be seen in their full beauty when attention has been given to the composition of the border.

Incomparably the soil they love best is a fairly strong virgin loam, open and free from stickiness. To this should be added a liberal dressing of well-rotted manure from an old hotbed, a little mortar-rubbish, and some road-scrapings if procurable. These are better omitted if the roads in the district are metalled with granite.

A light addition of bone-dust may be used safely and with effect.

The heavier the loam used the more liberal must be the additions of the other constituents of the border to keep it *well open.*

On no account should rank fresh manure be used; the plants appear unable to assimilate it. When used the foliage is apt to turn yellow, and the plant to deteriorate distinctly under its influence. Nothing can beat thoroughly rotted old hotbed manure.

It is also a point of great importance that the border should be trenched and thoroughly remade every year before new layers are planted. This is, in the writer's opinion, the one thing most needful, and, unfortunately, the one thing also which is most frequently neglected on the ground of trouble, expense, or want of time. There is no more certain method of securing vigorous growth and plentiful bloom than the addition, when the border is remade, of a liberal supply of fresh loam, if not to the whole border, at any rate immediately round the plants.

It is true that Carnations are year after year successfully exhibited by growers who have no such supplies of new soil at their disposal, but they achieve their success by the use of a skill and experience which is less attainable by the majority of Carnation growers than fresh loam.

No amount of digging and turning over, no supplies of manure, farmyard or patent, can be relied upon to produce such satisfactory results as fresh virgin soil—"top-spit." It may be objected that fresh soil brings large additions of that most pernicious pest, the "wire-worm," and so it does; but no one who loves his flowers will dig in the new soil without careful examination of it. Fortunately the wire-worm is easily seen, and the greater part of them should be destroyed; as regards the balance, the advantage conferred by the new soil will amply compensate for occasional losses by wire-worm.

The border, when finished, should be well and firmly trodden down, and is then ready for the plants.

Plants.—These should be well rooted "layers." Small compact plants that have not flowered during the summer may be left undisturbed in the garden border, and *may* produce a plentiful supply of flower the following summer. But, in making a special Carnation bed, it will certainly be wiser to fill it with fresh layers, for they can be better depended upon to withstand the rigours of the winter; and the blooms produced, though they may be less in quantity, will be greatly superior in quality.

The following experiment was tried last year by the writer. Some forty or fifty plants were

kept pinched back and not allowed to flower during the summer in the hope that they might be grown on into big plants, and produce a fine show of bloom the following summer. The result was that during the winter many died, and those which survived were so crippled as to be worthless. The winter, it is true, was exceedingly severe; but layers, with but few exceptions, stood it uninjured.

It is of the utmost importance also that the layers should be well rooted; those that are not should be unhesitatingly rejected.

As the subject of layering Carnations will be treated elsewhere in this "Manual" it will not be necessary to touch upon it here.

The whole success, however, of the following summer depends upon these layers being *well established in the border before the rough cold weather sets in*, and this may not and probably will not be assured unless they are all in their places by the middle of October.

Planting.—The writer prefers planting the layers singly, about fifteen inches apart. They may, however, be put in in groups of three layers, in the form of an equilateral triangle, presenting in summer the appearance of a single fine plant. This detail may be left to individual taste. The main point to be remembered is to plant fairly deep and *very firmly*.

This matter of firm planting is most important

and cannot be too strongly insisted on. Indeed, given that the soil is in proper working order, the plants cannot be put into it too firmly.

They must be watched carefully at first for traces of the work of wire-worm and maggot, but as the precautions against these pests have been made the subject of a separate paper, it will be unnecessary to detail them here. The autumn work is now complete, and the plants may be left practically to take care of themselves during the winter. But as no good management and no skill will prevent a certain percentage of losses, it is well to keep a reserve of layers (say to the extent of 6 or 8 per cent.), which should be potted, and stood on planks or ashes in some convenient corner. They will naturally move at any time far better from pots than from the open border.

This reserve of potted layers should during the winter months be, if possible, protected overhead from drenching rains and snow, but must always have abundance of light and air. The best time to fill the vacancies caused in the borders by death or disease during the winter, is the first opportunity afforded by open weather after the middle of February. It will be easily understood, therefore, that if these reserves have not been kept thoroughly hardy and exposed to everything but excessive wet and snow, they will inevitably come to grief on their sudden transference to the open border.

When filling up the vacancies, remove all ailing or crippled plants; they will do no good in the ensuing summer, if they do not die outright before the blooming season.

It is necessary after frost to examine the plants. It will often be found that the frost has loosened and lifted them, and that a considerable proportion will require firmly setting down again into their places.

Spring Treatment.—Beyond keeping the surface of the border clean and open, there is little to be done until the plants begin to make their growth. The staking and tying should then be at once attended to, as an hour or two of rough wind may do irreparable damage. Care should be taken in tying that the bass is not fastened to the stake, but left loose so that it may slip up with the growth of the flower stem, which may (indeed will) be permanently crippled by a neglect of this precaution. It is well to paint the flower stakes some dark colour; it preserves them, and prevents the unsightly appearance presented by a forest of white sticks.

In tying it is not necessary to include the grass; the flower stems alone need support. To leave the foliage in its natural position makes it much easier to layer later on.

Towards the end of May it will be found advisable, especially on light hot soils, to mulch

the beds with thoroughly well-rotted manure, and if the weather be hot and dry great attention must be paid to watering. This matter of watering is very important, for if the plants are once allowed to get too dry at the roots all hope of fine bloom is at an end for the year. It is true that in our rainy climate a deficiency of water is not often to be feared, but a caution upon the subject is necessary.

Plentiful syringing in dry weather in May and June will be found of great assistance to the plants; it encourages healthy growth and helps materially to keep down green-fly, thrip, cuckoo-spittle, &c. The plants must be carefully watched during the summer for these pests, which must be diligently got rid of. Perhaps the best, at any rate the most easily applied, remedy for green-fly, is dusting the plants with tobacco powder.

Cuckoo-spittle must be removed by hand, and is easily kept down; but thrip is a very troublesome enemy to get rid of. They do not appear to injure the plant materially, but they destroy the beauty of the bloom even while yet in the bud: The writer's plants were infested by it last summer. Weak tobacco water is said to be the best remedy, but proved of little service.

Disbudding.—There has been much discussion on this subject. It cannot be denied that the beauty of the plant is greatly enhanced by its

buds; nevertheless, as most varieties produce these in superabundant quantity, the greater part may be removed with advantage to those which are left, and without detriment to the beauty of the plant. The buds which often cluster round the crown blooms should certainly be removed.

A vigorous and healthy plant, however, may safely be left with a liberal supply of buds without any perceptible depreciation of the size or quality of its flowers. The matter must be decided by individual experience and taste.

Under no circumstances should a plant once established in its flowering quarters be moved. If disturbed in the spring it will produce but a few sickly flowers, or a small amount of weak, poor grass.

The points, then, to be attended to are:

First, a judicious selection of varieties to be grown:

Secondly, an annual "remaking" of the Carnation border, with a liberal addition of *fresh loam*.

Thirdly, the thorough establishment of the plants in their flowering quarters before the bad weather sets in.

Fourthly, very firm planting, and careful attention to the plants after frost.

Fifthly, that plants once established should never be disturbed.

THE CARNATION IN THE FLOWER-GARDEN.

By W. Robinson, F.L.S.

After taking great pleasure in the Carnation as grown by florists, with all its delicate colouring and charm, I was led by various reasons to the conclusion that a new departure was necessary with the Carnation as a garden-flower. This may take place without detriment to the "florist's" interesting way of looking at and growing the flower. Our flower-gardens have to a great extent been void of beautiful flowers and plants. Flowers! Acres of mean little sub-tropical weeds that happen to possess a coloured leaf—Coleus, Alternanthera, Perilla, &c.—occupy much of the ground which ought to be true flower-gardens, but which is too often set out in tile patterns, and with plants without fragrance, beauty of form, or even the charm of association.

My view is that the flowers of our own latitudes, when they are beautiful, are entitled to the first place in our gardens. Among these flowers, after the Rose, should come the Carnation, in all its beauty and brilliancy, where the soil and climate

are fitted for it, as is the case over a large area of our sea-girt land.

It is not enough that the laced, flaked, and other beautiful groups of the varieties of *D. Caryophyllus* should be grown in frames or otherwise; we should show the flower in all its force of colour in our flower-gardens, and this is an entirely distinct question from the growth of kinds hitherto known as "florists' flowers." A great many people who may not have the skill, the time, or the means necessary for the growth of the finest florists' flowers, would yet find the strong and brilliant "self" Carnations delightful in their gardens in summer and autumn, and even in winter, for the Carnation, where it does well, has a fine colour-value of foliage in winter, which makes it most useful to all who care for beautiful colour in their gardens. There is nothing more welcome as colour than strong groups or tufts of early autumn-planted Carnations grouped among Tea Roses, adorning the garden throughout the winter and spring, and full of promise for the summer and autumn.

What Carnations are the best for the open air? The kinds of Carnations popular up to the present day are well known by what is seen at the Carnation shows, and in the florists' periodicals, like the *Floral Magazine*, *Harrison's Cabinet*, and, indeed, all similar periodicals up to our own day, when I began

to insist that all flowers should be drawn as they are. The artist should never be influenced by any "rules" or "ideals" whatever, but be allowed to draw what he sees. This all conscientious artists expect, and it is the barest justice. If we succeed in developing new races, or what we consider perfect flowers, let the artist see them as they are, and draw them as he sees them, without the confusion of drawing impossible hybrids between what he sees and what he is told is perfection in a flower. It was the want of this artistic honesty, so to say, which has left us so worthless a record in illustrated journals of the past, where the artist was always told to keep to the florist's "ideal" as to what the flower should be. Hence the number of plates of flowers of many kinds, all drawn with the compass and quite worthless as a record!

There are so many difficulties in the way of reproducing a faithful drawing when we get it—I mean in sufficient numbers for popular use—that it is all the more necessary to abolish the fatal source of error here pointed out. Grow as many beautiful flowers as you can, but commit them to the artist's care without a word of comment, and so abolish for ever the ridiculous painted lies which abound in the pictorial gardening literature of the past, and which have indeed existed up till quite recently. The system lent itself to fraud as well as ugliness, as, for instance, in the case of manufacturing a new

rose out of "Fortune's Yellow," the too famous "Beauty of Glazenwood."

Behind the florists' plates of the past few generations we have the pictures of the Dutch flower-painters containing fine Carnations, well grown and admirably drawn after nature. These artists were not confused by any false ideal to which they were to make the flower approach, and so we have a true and precious record of what the Carnation was in long past days. In these pictures we generally see the finer striped and flaked kinds given the first place. It is quite natural. Such varieties are beautiful, and apt to strike people the most; and in those days little consideration had yet been given to the question of *effect* in open gardens. In our own day this question has been forced upon us in very unpleasant ways by masses of crudely arranged, and not always pretty, flowers, which we should improve upon! One of the aids in that improvement is the Carnation in its pure and lovely colours—colours which no other flowers possess. It would be a pity to use these lovely colours only for "button-holes" and for the house, when they are capable of affording us such splendid effects in our summer and autumn gardens, in the days when people see and enjoy their gardens most.

Few people, up to the present, have had an opportunity of seeing the fine and distinct effect

these flowers can give in the open garden. Hitherto the effect of the Carnation in masses has been mostly judged of from the Clove Carnation. Fine and precious as this is, it is, I think, not so good as many varieties now obtainable, which are better, stronger, flower longer, and are finer in form. The following are the best kinds tried by me without protection of glass at any time: "Murillo," "Carolus Duran," "Comte de Melbourne," "François La Charme," "Veronica," "Madame Roland," "M. Andreoly," "M. Bergendi," "Paix d'Amiens," "Marquis de Dampierre," "Mdlle. Rouselle," "Jenny Lind," and "Mrs. Wood."

These represent the Carnation of our own day in its finest form, as far as I know—perfectly hardy, if layered in the summer and early autumn, and planted early. Rooting well before winter in easy and bold groups, they afford pretty effects of colour from foliage alone, and even in winter time adorn the garden.

A good garden Carnation should be a vigorous grower, a free bloomer, with strong flower spikes and stalks, that carry their flowers erect. Above all things it should not burst its calyx. There are many Carnations that will have to be discarded because of this defect. The extent of the evil is not so apparent to those who grow a few plants only, and these, perhaps, in pots. They put bands upon the calyx or tie it round to keep the flower

together and in shape. But, if we have a few thousand carnations in the flower garden, it is out of the question to think of taking such measures, and yet on the other hand, if we do nothing at all, the result is that, after a heavy shower or moderate wind, the flowers of these calyx-bursting varieties are a shapeless mass of ragged petals.

Those who raise new kinds must give this matter consideration. Calyx bursting is only peculiar to some kinds, but we must regard it as a defect, and they must insist upon kinds whose flowers open properly and keep their perfect form while they last. There are such kinds already, and it is easy to increase their numbers.

Some varieties are very continuous in bloom, like the "Countess of Paris," and these I hope will be added to as time goes on.

Over a very large area of the United Kingdom Carnation-culture may be carried out with success. I have always noticed it most successful near the sea. The gentler warmth of the shore in some way influences this. In any case the best results I have seen from out-door culture have been in places like Scarborough, Edinburgh, Anglesea, the shores of Dublin Bay, and in sea-shore gardens generally where the soil is not against it. It is simply wonderful what one may do in such places as compared with what is possible, say, in the Weald of Kent! At Scarborough we may see Carnations

taking the form of a bush; near Edinburgh I have seen a tuft of the Clove Carnation five feet in diameter, whereas in Sussex and Kent we have to plant annually. I have incurred an amount of expense and labour with Carnations in Sussex which, if expended in a sea-shore district, with favourable soil, would have given me a paradise of Carnations. In our island the area for shore gardens being very large, one may see from it how important the flower in gardens in sea-shore districts may be, valuable as it is in any place where it happens to do well. Some sandy and warm soils, like that of the Bagshot sands for example, are singularly adverse to the Carnation; these soils, however, do not cover a large area of the country.

In advocating an extension of ways of growing this noble flower, I may perhaps be permitted to state the results obtained in my own garden in Sussex, and in a very important garden in Suffolk, two districts widely different as regards soil and climate. In my own garden I collected all the kinds of Carnations of the self, or one colour, that could be got in France or England, and grew them both in lines in a very exposed and quite unprotected situation, about five hundred feet above the sea; and also in groups and masses in the flower-garden, generally with very happy and distinct results both as to colour and beauty of bloom, the failures being mostly from late planting.

So far as hardiness is concerned, we had no trouble in proving the absolute hardiness of the Carnations mentioned—the harder the winter, the happier the flowers. An open, changeable winter is much more against them, by exciting growth, than a hard winter. They were planted in large and simple flower-beds near the house, between groups of tea-roses, occasionally running into the more open groups. In mixed beds such as I employ, where there are many tufted pansies and other hardy and half-hardy flowers, it is easy to get places for groups of Carnations in early autumn. It is essential to get enough of each kind after first determining what kinds and colours are desired. I mostly planted in informal groups of from twenty to fifty.

On the margins of mixed borders the same Carnations may be used with excellent effect, especially for those who frequent their gardens late in the summer and autumn. Beautiful effects of colour may occasionally be had in such borders by associating with the Carnations other grey-hued plants, such as Lavender and Rosemary, also planted in some quantities. The soil of my own garden was a deep unctuous loam, the rainfall of the district being rather higher than that of the surrounding country. Though successful, the experiment could not be said to have been made under the best conditions.

The next experiment was at Shrubland Park,

in Suffolk, under conditions totally different, where Lord De Saumarez entrusted me with the remodelling of this garden, which was for long perhaps the most famous "bedding-out" garden in England. I had to consider the question of its permanent embellishment with beautiful hardy flowers, the carpet and bedding systems, white gravel and broken coloured brick, having been given up. The soil of the place is a light warm friable loam, delightful for gardening; and so I determined to plant to a great extent, with the Carnation, Tea Rose, Tufted Pansy, Lavender, Rosemary, and all the beautiful and hardy plants obtainable. Very many of the finest Carnations were used, and with most excellent effect. The beds were simple and bold, and we had large masses, in groups, of the finest self Carnations known.

The climate, like that of the eastern counties generally, is colder than that of Sussex in winter, but perhaps brighter in summer, and a better result was obtained than in my own garden; so that between these two very different districts we have evidence that the Carnation can be used (not merely the Cloves, but many other handsome forms ranging through the finest colours) with the most artistic and in every way satisfactory effect in the flower-garden.

The flower is certainly next to, and, in some points, even superior to the Rose—in decision of

colour, and in fragrance surely we may place it next.

It is needless to go into the question of culture, because that is dealt with by Mr. Herrington in this book. He was with me at Gravetye when we made extensive experiments with Carnations. He planted the flower-garden at Shrubland Park, and having gone into it with hearty interest and intelligence, knows all the conditions essential to success.

The hardiness of the flower is proved by the natural habitats of the plant, which is found in rocky regions in many countries of Europe, and may be seen on Rochester Castle, and at Château Gaillard, in Normandy. In my experience it never suffers from cold, though alternations of mild and hard weather will often affect it on cold soils, especially where early autumn planting is not the rule. All Carnations planted in November, say, are more likely to suffer than those planted in September.

Rabbits and Hares are, perhaps, the most to be feared of the enemies of the Carnation in country places. It is absolutely necessary to wire out all rabbits and hares where Carnations are grown to a large extent in the open air.

The first year we lost every one of several thousand plants, all of which disappeared during the hard frost, when food was scarce! Afterwards, by

thoroughly fencing about seven acres around the house, we had no further trouble. In large healthy groups in the garden Carnations offer a tempting treat, especially in long continued hard weather, when little other food can be got owing to the snow. In such weather hares and rabbits can easily cross water, and wreaths of snow will sometimes gather round fencing, so that all precautions must be taken.

THE CULTURE OF GARDEN CARNATIONS.

By A. Herrington.

The greatest success in the culture of any class of plants is only attained by the observance and practice of essential details. These, as far as Carnations are concerned, are simple enough for anyone to understand and perform. The first and most important matter is that of soil. Those who can command an unlimited supply of loam are fortunate, because there is nothing better than this. The beds in which I have been growing Carnations for several years past were specially prepared for these plants and Tea Roses. They were dug out to a depth of about two feet, and filled up with loam—the top spit of a pasture. But loam has its drawbacks, for it generally teems with one of the worst enemies of the Carnation, namely, the wire-worm. This grub, however, is but the larvæ state of a beetle which lays its eggs in grassland, and therefore, by trapping the grubs at first and destroying them, in the course of two or three seasons we can be effectually rid of it. That, at least, is my experience of wire-worm. However, ordinary garden soil will grow as good Carnations

as anyone can desire, and, as a matter of fact, my nursery where stock is raised is a border in the kitchen-garden which has been cultivated many years. Upon very light soils Carnations are not satisfactory, but they thrive in those of an opposite extreme which become hard, and caked, and crack during drought.

To ensure a good display year after year fresh plantations should be made annually. Carnations that are closely massed for floral effect are rarely useful after they have done flowering, and old plants are subject to risks that young ones escape. With age they become straggling, and their stems get woody and gouty. When they are in this state winter generally destroys many. It is not fair, however, because old plants are injured and even killed in winter, to say that Carnations are tender. In practice it has been proved again and again that young plants survive extremes of weather, which will kill older plants of the same variety. There are a few gardens where Carnations spread into healthy, compact tufts, which may stand for several years, but the practice that must be generally adopted, and which I always follow, is to raise a fresh stock each year by layering. This is by far the best method of increasing outdoor Carnations. Moreover, layering must be regarded as the most important detail, because it alone enables us to provide a vigorous, healthy stock of young plants

such as will live through the winter and grow and flower satisfactorily the following year. Its great advantage is the small amount of risk involved in the practice.

Many things may happen to destroy a cutting when detached from the parent plant, but a layer is not detached, and, if properly put down, is all but certain to succeed and make a plant.

I endeavour to have this operation completed either by the end of July or early in August. This means that we have to be layering the shoots in the height of the flowering season. But it is undesirable when our groups are in full beauty that we should be working among them layering the shoots, as, beyond a few outside growths, it is not possible to do much without doing harm.

Yet it is a matter of first importance to layer early, in order to secure plants for early planting, and, to meet the necessities of the case, the plan I am now adopting is to have a nursery stock grown on purpose for layering. A sunny border in the vegetable-garden is made up into beds about four feet wide with alleys between. We select plants of medium strength, and plant them in rows about fifteen inches apart. They are planted rather thickly in the rows, because there is abundant room to layer the shoots in the spaces between. This simplifies matters exceedingly, as layering can be performed as soon as the shoots are ready, and

it can be done speedily. The flower-stems being cut at the same time tends to throw all the plants energies into the desired channel, and we always attain better results than ever could follow layering the flowering plants in the flower-garden. Of course, this plan is only possible when good kinds are grown in quantity. If we only selected twenty-five plants for the nursery, we are sure of obtaining a hundred good layers, and four per plant is a low average for those grown expressly for the purpose. It is invariably exceeded. Our soil being of a friable nature, layering is thereby facilitated. If the weather is dry, the soil is moistened as the work proceeds, the surface is loosened, and it readily breaks up into fine particles. The shoot, after removal of the lower leaves, and cutting half through the joint on the under-side, is pegged down firmly upon the surface, and slightly covered with fine soil provided for the purpose. I believe strongly in this shallow layering. There is no need to cover the layered shoots with two inches or more of fine soil, which, unless frequently watered, is a dust-heap. If the weather is very hot and dry, the layered shoots receive a little water for the first week or ten days; but even beneath a bright sun they soon freshen up again, because they are half attached to the parent plant, and are therefore still sustained, even whilst they are preparing themselves for a separate existence. In from six weeks to two

months these layers are fit to detach and transplant. Thus they are ready for the most favourable planting season, which is from the middle of September to the middle of October. This is, therefore, always a busy time with the Carnation-grower. Fine weather usually prevails, and planting is a pleasure. The site or soil for each new group should be prepared by digging it deeply, manuring it if needed. We then have simply to sever the connection between the layer and the old plant, lift the layer by means of a trowel or hand-fork, and transplant it to its new position. Not a moment is lost, but the plant starts rooting in a few days, and endeavours to take so firm a hold of the soil that frost's upheaving action may not move it. I would advise everyone to try early autumn planting before they adopt the more expensive, troublesome practice of potting up the layers, giving them frame-protection during winter, and planting them out again in spring. Dry weather, as a rule, soon sets in after planting in spring, and Carnations do not root rapidly like some plants, therefore are liable to suffer. At all times a firm root-run is essential, and the plants should be firmly pressed at planting-time, or even trodden in lighter soils that will bear treading.

We do not plant the same ground with Carnations year after year, but vary the arrangements by having groups of choice summer-flowering,

hardy plants, or such things as Stocks, Zinnias, Asters, Verbenas, Phlox, &c. These, if prepared for early flowering, are on the wane by autumn, and it is easy to destroy them, dig the ground, re-enrich it, if necessary, with thoroughly rotten manure, and then all is ready for planting our layers from the nursery. What a great gain we have here All the beds need not be bare and dreary for the winter months, and when the next year comes a great part of the garden is planted. After planting thus early, the plants obtain firm roothold of the ground, and though the winter be long and severe we need not be anxious. When the thaw comes it is well to look the plants over. The frost has upheaving tendencies, and if it should have lifted up or loosened any of the plants, they should be pressed back in their places. All that now remains is to keep them free from weeds, and as warm, dry weather approaches, fortify them against drought with a mulching of rotten manure, leaf-mould, or even fresh soil with soot or wood-ashes mixed with it. As the flower-stems appear, there is nothing neater and less conspicuous than a hazel-stick to afford the necessary support. Now that all is told, it is apparent what little labour is involved, and that only at a time when it can be performed with pleasure.

As many flower-gardens have extensive grounds attached to them, it may be well to state that game

of any description, especially hares, rabbits, and pheasants, are the worst enemies of Carnations, and ought to be excluded from all gardens where Carnations are to be grown. I did not think that pheasants were capable of doing so much mischief till this last winter. Now, convincing proof is forthcoming, in the absolute destruction of a group of promising seedlings, many of which were strong tufted plants more than a foot across.

CALENDAR OF OPERATIONS IN CONNECTION WITH BORDER CARNATIONS.

By Martin R. Smith.

It hardly seems necessary to state that the Carnation, like all other flowers, must be kept free from weeds, and be protected, as far as possible, against the attacks of insect pests of every description.

It would be superfluous, therefore, to add to every month's operations reminders of these simple duties we owe to our plants.

Let it be sufficient to state, once for all, that green-fly and cuckoo-spittle must be watched for and at once removed; they are both terribly prejudicial to the welfare of the plants.

My own plants are in some seasons infested with thrip, and hitherto I have failed to find any satisfactory method of getting rid of them. They damage the blooms, but do not appear to affect materially the health of the plants.

JANUARY.

Taking for granted that the plants were put into their flowering quarters in early autumn, and

are in consequence well established, the work of the cultivator will be very light during this month.

Cleanliness is of great importance, and the plants should throughout the year be looked over at convenient intervals, and all dead and decaying foliage removed with a pair of scissors.

Take care that the reserve stock of seedlings and layers, kept in pots, get as much air night and day as it is possible to give them. Water very sparingly, if at all, and be careful that the lights protecting them are not left off in heavy rain-storms or snow. The lights may be covered with mats if exceptionally severe frosts are expected, but under all circumstances they must always have plenty of air.

FEBRUARY.

Use the Dutch hoe freely to keep the surface of the beds open and sweet.

If the weather is genial and open, it will be well towards the end of this month to fill up from the reserves of seedlings and layers vacancies caused in the borders by death.

There is no doubt that, weather permitting, the sooner these plants are put out after the middle of February the better.

MARCH.

If not already done, take advantage of the first open weather to fill up all vacancies in the border.

If the reserves will permit of it, do not hesitate to replace sickly or weak plants, for it is certain that they will produce no blooms worth having, if indeed they do not die outright later on.

About the middle of this month sow seed. It should be sown in pans thinly, and kept in a mild hotbed—say of temperature 85° to 90°—until it germinates, after which the pans should be *at once* removed to an intermediate house.

APRIL.

In ordinary seasons the plants in the borders will now be showing signs of active life, and the Dutch hoe should be kept going.

During the early part of the month prepare boxes and compost required for the pricking off of the seedlings sown during March. These will probably be ready for removal from the seed-pans about the middle of the month, when they have formed their first rough leaf.

Prick off three inches apart, and replace in the green-house. (For detailed instructions see the body of this work.)

Take care that the seedlings are accurately labelled with the names of the parents.

The beds for the reception of these seedlings may be prepared this month.

MAY.

If not already done, prepare at once the borders

decided on as the flowering-quarters of the seedlings. Towards the end of the month these should be sufficiently advanced to plant out. Let the bed be well pressed down, plant firmly and rather deep.

As it will be found very useful to have a "reserve" of seedlings from which to fill ugly gaps that may be found in the seedling-bed in spring, place such number as is required in 2½ to 3-inch pots (inside measure), and keep close in a cold frame for ten days, after which they may be turned out, and stand in any convenient corner upon planks or ashes, where they will practically take care of themselves during the summer.

Towards the middle of the month it will be well to give to every plant in the border its flowering-stake. These should have been prepared and painted at convenient times during the winter months, and from this time forward, until the plants have attained their full growth, the tying of the flowering-stems will require continual attention. It is not a task that can be finished off at once and laid aside.

If the soil is hot or dry, it will be well to give the flowering stock a good mulching of *thoroughly well-rotted* manure. It is a little untidy, but on some soils is necessary.

It will be better this month to set traps for that most destructive of pests—the earwig. No device

is better than that of small pots, half-filled with dry hay or moss, upon sticks nine or ten inches high, placed among the plants. They are not sightly, but are certainly very effective. They should, of course, be visited every morning, and the occupants destroyed. Green-fly is apt to be very troublesome this month; when it appears it *must* be at once got rid of, or the plants will suffer materially.

JUNE.

Unremitting attention must be given to the tying of the flowering stems.

Commence disbudding so soon as the young buds can be conveniently handled.

If the weather is dry and hot, and the soil light, it is absolutely necessary to water, for if the plants once get over-dry at the roots all hope of fine bloom is at an end.

Plentiful syringing will help and encourage the plants, and tend to keep down green-fly, thrip, &c. A little very weak liquid-manure may be used with some varieties and on some soils, but if the border has been properly made it should not be requisite, especially if the mulching with well-rotted manure has been carried out.

If the seedlings were not planted out at the end of last month, no time should be lost at the commencement of this in getting them into their flowering quarters.

JULY.

Continue attention to the tying of flower-stems, and disbud as required.

Tie buds inclined to burst their calyx with raffia matting, or use small india-rubber bands. Water freely if the weather is persistently dry and hot. Towards the end of the month begin layering such plants as have their "grass" sufficiently matured; this is to some extent evidenced by the waning of the flowers. As the plant goes out of bloom, it may be considered ready to layer.

If spare time can be found towards the end of the month, it will be well to put in hand the border which is to receive the new stock of layers. (For detailed instructions, see the body of this work.)

During this month the previous year's seedlings will have been in full bloom. There will certainly be a percentage of "singles" among them, and these should be ruthlessly pulled out of the beds as soon as their shortcomings are discovered.

There will be a further large percentage of double varieties, too rough or too thin, or with the short, round buds, which prove that the flowers will certainly have a tendency to burst their calyx. These, too, should be all cleared out of the border, giving air-space and room to the more deserving or promising plants that are left.

AUGUST.

The cultivator's whole attention must be given, during the early part of this month, to the layering of stock, and the sooner this operation can be completed the better will be the chances of success during the following season. If the weather is hot and dry, great care must be taken that the layers do not flag for want of water—an almost daily attention may have to be given to this requirement.

The border to receive the new layers, if not done last month, should be put in hand and finished off as early in the month as possible, so as to give it time to settle down somewhat. (See detailed instructions.)

SEPTEMBER.

Continue careful attention to the watering of the layers.

Prepare pots and compost for reserve of layers.

Towards the end of the month the earlier layers will be sufficiently rooted, and may be taken from the parent plant and placed at once in their flowering-quarters, which should be ready to receive them. Plant very firm.

It will be found advisable to *pot* a certain proportion of surplus layers as a reserve from which, in the spring, to fill the vacancies caused by disease or death in the borders.

Pot such reserves firmly in 60-pots, and keep comparatively close for ten days in a cold frame, until root action has commenced, after which they may be put for the winter wherever room can be found for them, their only requirements being plenty of light and air, and protection from heavy rains and snow. No cold will hurt them so long as they are kept dry. Water only when absolutely required, keeping the foliage dry.

They may be covered overhead with mats if frost is very severe, but *must always have air.* Commence a careful watch among the new layers and the seedlings for signs of the Carnation maggot. This will require for the next two or three months incessant watchfulness and care; it is the worst enemy of the Carnation, and if not attended to may cause irreparable damage. (See remarks on this subject in the body of the book.)

OCTOBER.

Complete the taking up of the layers. This should be finished by the middle of the month, or at latest by the end of the third week.

NOVEMBER.

During this and the following month there is but little to be done to Carnations in the open border.

Early frosts, if the layers are not well established, are very apt to lift them, and care must be taken that they are firmly pressed down into their places again.

Keep the reserves of layers and seedlings exposed completely in dry weather; be very sparing of water—better none than too much.

DECEMBER.

Continue the operations of November.

THE CARNATION AS A TOWN FLOWER.

By Martin Rowan.

That the Carnation is second in beauty and interest only to the Rose is admitted on all hands, and a "close second" to the Queen of Flowers its votaries may not unjustly claim for it. If Nature has denied to the Carnation all the sumptuous beauty of the Rose, she has bestowed on her to very lavishness the not less precious gift of variety; for in the diverse qualities characteristic of the many classes of the flower—in the brilliance and force of the scarlet and crimson bizarres, the tenderness and grace of the rose and purple flakes, the delicacy and refinement of the edged Picotees, the rich colouring of the Selfs, the picturesque and almost infinite contrasts of the fancy and yellow-ground flowers—we have a range of varied beauty hardly to be found in any other flower; while with the Cloves we have, in addition to their rich hues, a fragrance of their own not inferior to that of the Rose itself.

With the townsman, indeed, the Carnation must hold not the second, but the very first place in his regard, for while the Rose—like many another old favourite—refuses to dwell within the

smoke circle, the Carnation will put on its best for us even in the smallest of town gardens. The great manufacturing towns of the Midlands and of Lancashire and Yorkshire have all their knots of enthusiastic and successful cultivators of the flower. At Sheffield, in one of the worst of climates, Mr. Simonite has raised some of the finest varieties of Carnations and Picotees that we possess; and all Mr. Dodwell's finest seedlings, up to the time of his removal to Oxford a few years ago, were raised within ten minutes' ride of Victoria Station. My own flowers are grown in the same locality, and, indeed, the bulk of the exhibitors at the great metropolitan and provincial shows are amateurs, with town gardens, cultivating their plants under all the citizen's wonted disabilities of bad climate, cramped space, and scant leisure snatched from busy avocations of every sort.

The fact that, in spite of all, the town grower is at practically no disadvantage when competing with country-grown flowers, best shows the plant's patient endurance of a smoke-laden atmosphere, and well entitles it to be regarded as in every sense a true townsman's flower.

For the beginner, the Carnation year may be taken as commencing with the latter part of September or beginning of October, when the layers are ready to take off the old plants, and they should then be obtained from the nurseryman.

If well-rooted plants, they may be at once planted out where they are to flower, which should be in as sunny and airy a position as possible, the ground having been previously prepared by trenching to the depth of about a foot and a half. If the soil is light and poor, some of it should be removed, and a compost consisting of good loam (two-thirds) and old rotted manure (one-third) worked in to replace it, the loam having been first well turned over and examined for wire-worm. If, on the other hand, the soil is very heavy, a mixture with it of some of its own material that has been burned, or the ash from a garden-fire, or the addition of some lime-rubbish, will do much to improve it, and the raising of the beds some six inches or so above the surrounding level is, in such circumstances, a welcome concession to the habit of the plant, which dislikes stagnant moisture.

In planting, some of the taller plants will, especially if high winds prevail, be much aided by sticks placed crosswise to steady them, for a plant is hindered in getting established if disturbed by being blown about immediately after planting. During the winter the plants will want looking after when, in periods of thaw succeeding long frost, they may have been loosened and heaved up from the ground, and care should then be taken to set them firmly in the soil again.

Poorly-rooted layers, when received, should be

potted up in small pots in light fibrous loam, to which may be added about a fifth part of good sweet-leaf mould, if obtainable. They should be placed at the sides of the pot, with some coarse silver sand at the base of the layer to encourage the emission of roots. Two may be placed in a pot. They should be sprinkled and placed in a cold frame, shaded from bright sun, and kept closed down for three or four weeks, until they appear to be established. They may be planted out the following February or March.

In localities where the soil is wet or badly drained, it is better—in fact, necessary—to pot up the stock in small pots, and winter the plants in a cold frame, following the detail in this matter which will be presently given in dealing with pot-culture. They should be planted out where they are to flower, about the end of February or some time in March, according as the weather may prove favourable for the operation.

To return to our autumn-planted layers. By the end of April or beginning of May, according to the season, the plants will begin to throw up the main stem or to "spindle," as it is called, and will soon afterwards want staking and tying as they grow on. Green fly and spittle fly must be watched for and promptly destroyed.

Early in June a surface-dressing of rotted manure will be found serviceable in promoting

vigorous growth in the plants. From this time onward to the period of flowering—about the 20th of July in an ordinary season here in the south—they will want little further attention beyond the tying and the watching for the attacks of green fly and the ordinary garden enemies.

Towards the latter end of July, or as the plants are going out of flower, they will be ready to layer. One often sees the grower urged to do this early, and good advice it is as a rule; but regard must also be had to the season.

Free rooting depends on the proper ripening of the grass, the time of which will vary as the season may be late or early. In a warm, genial, and early season, such as we had in 1885, layering might be done soon after the middle of July. In the very late one of 1888, or in those of the last two years, the second week in August was early enough to begin it. A large Northern grower wrote to me in 1890 that his failures were nearly all with the first layers—the second, done some weeks later, having been more successful. I have always taken the time as best indicated by the decline of the flower, and have never had any considerable percentage of failures even in such seasons as those above mentioned, when complaints were common.

The best compost for layering is one consisting of fresh turfy loam, leaf-mould, and coarse, sharp silver sand in equal parts. Some of the old soil

should be removed from about the plants to the depth of an inch or so and replaced with the compost. The layers should then be pegged down, sufficiently well covered with the soil, but not set too deep so as to be beyond the genial action of the sun. They should then be sprinkled with a rose water-pot, and this should be repeated as often as they become dry. If the weather is very warm at the time they may need sprinkling three times a day for a while, as it is essential that they should not be allowed to flag. As the sun declines in power, the sprinkling will be less frequently needed, and by the latter end of September or the beginning of October they will be ready to take off and plant out.

So far we have dealt with the Carnation simply as a garden flower; and here it may be well to remark that the foregoing recommendations as to culture are to be taken as referring not merely to the self-coloured or "border" varieties, as they are often termed, but equally to the bizarres, flakes and picotees—the exhibition sorts, as we are accustomed to call them, though in these later days they have no monopoly of the exhibition table. It seems necessary to point this out, as there is a rather prevalent impression, not only with the general public, but found existing even among gardeners and gardening writers, that the refined bizarres and flakes and picotees, because refined in

character, must necessarily be delicate in constitution. Of course, those who have practical experience in the culture of these beautiful flowers know this to be an entire error. There is hardly any grower of them, even among those following for exhibition purposes the system of pot-culture, who does not grow them also in the open ground. In fact, the Northumberland and great part of the Lancashire growers of the exhibition or florist Carnations grow them solely in the open ground, and certainly no severer or more conclusive test of the soundness and hardiness of the florist varieties than is shown in the practice of these Northern growers under the trying climatic conditions of their districts could be devised.

For the production of flowers for exhibition the plants in the South at least are usually grown in pots.

The system of pot-culture for exhibition flowers is one mainly of convenience, whereby the exhibitor may have his plants more completely under control than they could be in the beds or borders—this more especially at the time of blooming, in July, when, if the season be hot and dry, or prove a period of violent storms of wind and rain, as we have known it the last four years, the flowers have equal need of shade or shelter to preserve them in exhibition form. I would therefore advise anyone desiring to exhibit, especially in the larger classes,

to grow the plants he intends for such purpose in pots.

The soil suitable for potting up the layers in the autumn is light loam, with about a fifth part of good, sweet leaf-mould, and a little coarse silver sand. The plants should be potted singly in 2½ or 3-inch pots, according to their size, or two small ones may be placed together. They may be stood upon ashes or planted in a frame, and the lights should be closed down on them for five or six days while fresh roots are being formed, shading them meantime, if need be, from strong sun. The plants may then receive a watering, and air be given gradually until they are established, and in about three weeks the lights may be removed altogether when the weather is fine.

Once properly established, the plants should have plenty of air day and night through the winter. If very harsh winds prevail, the lights can be tilted so as to admit air from the leeward side. The chief cultural attention the plants need will be the looking after them for water, which they will require occasionally if the weather be open. It should be given in the morning, and without wetting the foliage. They must also be watched for green fly and for any sign of maggot, and decaying foliage should be removed.

By February the little pots will be full of roots in the case of the more vigorous varieties; and if

the weather be genial, any showers that fall will be beneficial to the plants.

By the latter end of this month, or from this time to the middle of March, as the weather may prove favourable, they will be ready for planting in the larger pots in which they are to bloom.

The compost I use is good yellow fibrous loam, three-fourths, and for the remaining fourth a mixture in equal parts of rotted manure and leaf-mould. To this is added a little coarse silver sand, with a little lime rubbish or bone-meal, and some charcoal broken up to the size of peas and shaken over the compost to keep the whole sweet. The loam may be broken up or sifted through a coarse sieve, but must be looked over carefully for wire-worm.

The most forward plants should be taken for potting first, and as the plants vary in size and vigour it is necessary to use more than one size flower-pot for them. For the largest and most vigorous growers nine-inch, for the average eight-inch, and for smaller growers seven-inch pots are the most suitable—two plants being placed in each. Scarce varieties may be potted singly in five- or six-inch pots, as their size and root development may demand. The pots should be well drained and the plants potted rather firmly. If the weather be calm and dry, place them at once on the open stage where they are to bloom. If

squally and rainy, keep them close in the frames for a week or ten days while they are establishing themselves, and remove them in batches as they have been done to the stage.

Up to the end of May the plants will need only the same attention as to staking, and tying, and watching for insect-pests, as those in the borders. Green-fly will need to be specially watched for, and may be removed with a camel-hair brush. If the plants should be much infested, it will be necessary to dust them with tobacco-powder, which must be syringed off again. The soil should be stirred occasionally, as it may have got hardened or green through rain or watering, the opportunity being chosen for this when it has become dry. A top-dressing of equal parts of loam, leaf-mould, and manure is commonly given at this time, but I do not myself regard it as a very essential matter, and as it takes time to go through the whole collection I have never practised it except in a very partial way.

Only the main stem of each plant is allowed to go up for bloom, the lateral flowering-shoots being stopped. Disbudding should be commenced as soon as the buds can be taken between the finger and thumb. Usually only two are left on the plant, but in the case of some very vigorous varieties three. These are the crown or main bud, of course, and the third and fourth from the top.

Many of the buds when they have grown their full size will need tying with a thin strip of matting or raffia to prevent their bursting.

In hot weather syringing up to the time the buds are showing colour is very beneficial in keeping down thrips, invigorating the plants, and inducing gradual and perfect opening of the buds.

By the first or second week in July, according to the season, the greater number will be showing colour, and must be protected from injury by sun or rain.

Where the stock is not large, or where stock and garden are both large, a glass-house affords, without doubt, the most convenient quarters for flowering—a free circulation of air and shading from hot sun being matters of course. Where, however, as in my own case, the stock is comparatively large and the garden relatively small, the erection of a glass-house large enough to take all the plants would be too great a sacrifice of garden space. By putting up a light but sufficiently strong woodwork over the stage, with a covering of very good calico, stout enough to resist heavy rain, while admitting light freely, a glass-house may be dispensed with.

Such a simple structure I found sufficient to resist the heavy rain-storms of the last four seasons without injury to the blooms. The flowers, even in these cold summers, developed perfectly under this

protection both as to colour and form. Opportunity should be taken in the early morning before the sun comes on, and again in the evening as soon as it has gone off, to lift the awning so as to give both plants and bloom the full benefit of the air, and in warm, settled weather I keep it off at night altogether.

CLASSIFICATION OF THE FLOWERS.

Under this head we may consider briefly the characteristics of the various sections of the flowers.

The Bizarres have two colours, disposed longitudinally on a white ground, and are sub-divided, according to the dominant colours, into Scarlet, Crimson, and Pink-and-Purple Bizarres.

The Flakes have one colour also laid lengthwise on a white ground, and are classed into Scarlet, Rose, and Purple.

The Picotees have the colour placed upon the edge, and are classed as Red, Purple, Rose, and Scarlet edges, and sub-divided according to the depth of the edge into heavy, medium, and light edges of these colours.

The above disposes of the flowers with distinctive markings on white grounds, and these are commonly termed among florists the "class flowers."

A wide section is embraced by the term "Fancies," which takes in all the flowers with

markings on coloured grounds, and also those too indistinctively or indefinitely marked on white grounds to entitle them to a place among the class flowers.

Most familiar of all are the Selfs, the flowers of one colour, embracing almost every tint but blue.

It will probably be somewhat of a puzzle to the novice when he happens to see for the first time two very different looking flowers—the one a more or less splashed flower, rather suggestive of the Bizarre or Flake Carnation, the other being the edged flower described above—each going under the title of "Picotee."

The French word *Picotée*, meaning "pricked," "spritted," or "spotted," describes the original type of flower from which first our Bizarres and Flakes, and much later—in fact, within living memory—our present all but faultless Picotees have been obtained. The actual process of evolution by which our Bizarre and Flake Carnations and our edged Picotees have been got, by select seeding from the pricked and spotted flower, according as the tendency has been shown to longitudinal or marginal marking, is now going on in the case of the yellow-ground flowers, which, till lately neglected by raisers, will doubtless be made in time out of the same spritted and spotted forms to yield us Bizarres and Flakes and edged Picotees, as has already been done in the case of the white grounds.

The Yellow-Ground Flowers are like a race apart from all the rest. Their richly varied and picturesque character makes them general favourites, but the difficulty experienced in maintaining healthy growth in so many of them in ungenial seasons—especially during a succession of cold, wet summers such as we have had for the last four years—is a great hindrance to their general cultivation. Dry cold in winter does not appear much, or at all, to affect them when the plants are healthy and sound to start with.

A long winter, followed as we had it in 1887 by a long, dry summer, suits them perfectly, and they grow in such case with the greatest vigour. In the exceptionally long and severe winter of 1890-91 a lot of Yellow-Ground Carnations, of his own seedlings, received from Mr. Dodwell, together, also, with some of his newer varieties sent me by Mr. Douglas, were wintered in a cold frame with air always on, and were frozen hard all through that long winter, yet not one succumbed or failed to flower last summer, though many a one "went under" before that season was out. Again, during the past long winter, among Yellow-Grounds of my own stock, and those received from various sources, all of which have been grown with the general stock without the slightest favour shown them, there has not been a plant that has not come through in sound health so far.

It is when "summer," in the words of Charles Lamb's old jest, "sets in with its usual severity"—of which we have had but too much experience during the last four years—that trouble begins for us. It is the check then received, after growth has been well advanced, through sudden change from comparatively high temperature to frost and cold harsh winds, that lays the foundation of the mischief, and when this is followed—especially as in 1888 and 1890—by long-continued cold rains, disease and loss among the plants are inevitable.

In this susceptibility to injury from check arising from constant and often extreme changes, the Yellow Carnation is not altogether alone, and before we bewail it in the words of Hogg, uttered over seventy years ago, and re-echoed oftentimes since, as "a tender exotic," we may remember that many a plant, even among those hailing from very cold latitudes, succumbs in a similar way to the treacherous nature of our climate.

The Yellow-Ground Carnation stands in much the same relation to the others as do the Tea Roses to the rest of their tribe. That they are for the most part more tender than their congeners may not be gainsaid, but their beauty is such that no one who loves either Roses or Carnations would willingly be without the Teas or the Yellow-Grounds merely on that account.

They should be planted only on soil thoroughly well drained, and made lighter than ordinary by the addition of leaf-mould and sharp sand or lime rubbish. Manure they are perhaps better without, except it be by way of a surface dressing in dry seasons.

In potting, the compost should similarly be rather lighter than usual, and in potting the plants on into the larger pots in the spring only very vigorous plants should be potted in pairs in the eight-inch pots. The weaker examples are best potted on singly into 4½ or 5-inch pots, according to their size and root-development, and when they have begun to fill these they may be potted on into 5- or 6-inch pots, in which they are to bloom. They will in this way have a better chance of making steady and firm growth, with consequently less liability to check and disease.

Happily signs are not wanting that along with higher development in the flowers, raisers are getting plants with more robust constitution and greater adaptability to varying and adverse seasonal influences.

A FEW WORDS ON DRESSING AND EXHIBITING.

The dressing of blooms intended for competition at exhibitions is often taken exception to in strong terms by some of our critics in the gardening press; but the objections, well-intentioned, no doubt, are

always found to proceed from those unfamiliar with the objects and conditions of competition. The practice is one which sanctions the removal, in the case of bizarred or flaked flowers, of a "run petal"—that is, a petal wholly without white, or of one wholly without colour, the presence of either of which in such circumstances is analogous to a discordant note in a piece of music; and as the most richly marked petals will often be hidden under others of inferior character, it permits the bringing forward and displaying of these so that the full merits of the bloom may be visible at once to the judges: just as an entomologist might display the rich markings of moth or butterfly which would have escaped appreciation unfolded to the eye.

It is a practice wholly confined to blooms set up for competition, and as such there can be no objection to it, while it has much to recommend it both from the judges' and exhibitors' point of view.

Again, much is often unduly attributed to the dresser's powers, especially by those who neither acquire his simple art nor take the needful trouble to grow their blooms into show form. All such it may be well to remind that though the dresser may develop he cannot create. He cannot make poor flowers into fine ones. I would advise young growers not to be misled by the tirades of the one set of critics nor discouraged by the jeremiads of

the other. While in the neophyte stage let them remember that, though skilful dressing may be in its way a fine thing, culture is *the* thing; for it is culture, which means the close and patient observation of the needs of the plant and attention to them, and not dressing, which produces exhibition blooms.

Again, it is often urged by the same class of critics who object to dressing that our mode of showing the flowers, arranged on a show-board without foliage, is inartistic; but here the same remark as to their want of acquaintance with the object sought by the display applies.

Our good friends' preconception of a flower show is always that of a floral bazaar or fancy fair, where decorative and picturesque effect is everything, and the individual types of the flowers hardly anything at all.

It is not pretended that our mode of exhibiting the flowers in the show-boxes is a perfectly artistic one, though it is by no means one where scope for artistic skill is wholly wanting, as some of our critics would find if they had to stage a twelve or twenty-four in competition with those who had learned their lesson in this matter from past masters like Dodwell or Simonite. Hardly a prettier exercise in "Chevreul on Colour" can be found than in the skilful arrangement of a stand of twelve or twenty-four Carnations or Picotees, whether of

the "class flowers," or the no less attractive self and fancy kinds.

The prime object sought by our mode of exhibiting is a strict comparison, by which the individual merits of the flowers can be thoroughly tested, and this, experience has shown, can be done in no surer way than by the existing system. Even the white paper collar which comes in for so much objurgation has its practical value in isolating each bloom and so aiding the judges in their decision on the merits of each flower as it passes under review, while estimating, as they have to do, those of the collection as a whole.

An exhibition of highly-developed flowers, such as Carnations or other florist flowers, like one of highly-bred animals, must be a presentment of the best types. The horses, say, may be made picturesque with trappings and caparisons and gaily-attired riders, but these are not the conditions which painter or sculptor would primarily select for the proper judgment or study of the animals, whatever the way in which he might eventually represent them. So with our flowers when set up in competition. No doubt the perfect—the ideal—exhibition would be one that dealt adequately with the flowers in all their aspects, and with all their possibilities; but for such an one, for the present, in connection with our Carnations, at least, we must be content to wait.

RUNNING OF CARNATIONS.

The sporting or "running," as it is termed, of the Bizarres and Flakes, by which the flowers become either self-coloured or retain the marking in deeper hues upon ground that has become wholly suffused with colour, is a frequent trouble to the cultivator of these flowers. "Why do Carnations run?" is a conundrum to which no one has hitherto found the true answer. It used to be thought that too highly manured soil was the most frequent cause of it, but experiments made with every kind of soil, from pure loam to manure alone, have given much the same results, and the soil theory is now generally discarded.

Again, it has been thought that cold, wet summers are mainly answerable for the trouble. But for my own part I have never had so many run flowers as in the long dry summer of 1887, nor so few as in the very cold and wet one of 1888. Hogg, writing in 1819, speaks of the universal prevalence of run flowers in the exceptionally hot summer of the previous year, and it is the only piece of positive evidence he had to offer on the subject; and similar evidence is about all we have now.

The run flowers, whether taking the form of Selfs or of Fancies (coloured ground with markings as already described), are often very handsome, and one is frequently tempted to layer the stock of

them, in the hope of their fully retaining their new character; but in my experience they are never so good as in the first season of the sport, coming after that always thinner in the flower and less brilliant in colour.

Occasionally they will go back to their original character, as was the case with Mr. Barlow's fine Scarlet Bizarre, Robert Houlgrave, which was largely productive of run flowers the first season of its distribution, but the run stock of which for the most part returned to its original character the following season. In the case of new or scarce varieties, it is always worth while to layer the run stock for the chance of its coming true again. Picotees are also known to run, but so rarely that practically they may be said to be exempt from the aberration which afflicts their brethren.

CARNATION CULTURE FOR EXHIBITION IN A SMALL GARDEN.

By J. J. Keen.

To the florist, the subject of the particular flower he loves to cultivate is at all times an engrossing and enticing theme; so much so that, whenever I meet my brother florists of this town, the conversation is rarely of anything else but our mutual hobby—"the Carnation."

It is upon this subject I have been desired by the Committee of the National Carnation and Picotee Society to write my experience, as "a small grower," for publication in the "Manual."

I would like it to be understood by the reader that I am "a small grower" from two causes—first, the want of spare time from my business, which necessitates my absence from home early and late; and secondly, the want of space in my garden wherewith to grow more than a certain number of plants. I am not "a small grower" from inclination, for, had I time and space at my disposal, I should grow largely.

I am a grower of the Carnation simply and solely for exhibition; exhibiting is, in my opinion,

the acme of pleasure in the growth and cultivation of the Carnation, or any other flower, for thereby the aim is high—higher, in fact, there cannot be, for the flowers have to pass the severest of criticisms, viz., that of the judges.

In the following remarks on the routine of culture required to bring the Carnation to perfection, it is possible I may be at variance with some of my brother florists in my methods; but, as the value of the "Manual" consists in the variety of experiences related therein, I trust that, if I am considered a little radical, it will be borne in mind that, for a young grower, I have been fairly successful.

Having assumed that the would-be florist has taken for his "hobby" the Carnation, I will try and explain what should be his mode of procedure.

He has been, perhaps, to one of the exhibitions, and taken his notes from the leading prize-stands of the lists of varieties he intends to grow.

Early in August he should send his orders for plants to some reliable florist or nurseryman, who makes the Carnation a speciality. By sending orders thus early, there is a better chance of obtaining scarce varieties, and of getting the plants home early: having prepared the soil for their winter growth, which I make up in about the following proportions (such proportions of course depending on the staple of the compost): one-

half good, brown, turfy loam; three-eighths leaf-mould and sandy road-sweepings; and one-eighth brown, fibrous peat. I consider the main element in winter cultivation is the making of roots, and, as will be seen by the composition of the soil I use, root-making material forms an important ingredient.

The plants, having duly arrived, should be potted without delay. I use pots of about three inches diameter, never placing more than one plant in a pot, as I have found that, where two are placed together, a great disturbance of the roots takes place in the spring, if they are separated when transferred to their blooming-pots. When potted, they should be put in a frame, and kept close for a week, and very little water given until they are fairly started. The question of the winter aspect that Carnations should have, is, I think, an open one, and depends entirely upon the convenience at the disposal of the cultivator. Up till last year, I have always given them a northern position, which I was given to understand was the correct thing; but I was not at all pleased with their appearance in that aspect, and what was still more important to me, in a monetary sense, was the losses I sustained by the plants damping off. I have, therefore, during the present winter given them a southern aspect, with the benefit of such sun as we get in the winter, and, up to the present time, the result has far

exceeded my expectations, for they have a finer, healthier, and sounder appearance, and I have only lost two plants from the before-mentioned cause. One thing, however, must be borne in mind in giving them the benefit of the sun, viz., that the lights must be taken off when it is shining brightly. I should here say that my frames are raised some eighteen inches from the ground, so that a free circulation of air goes through them, even when they are covered with mats to keep out the frost.

Having got the plants well established in their winter quarters, not much has to be done for a few months. The two main items are cleanliness—scrupulous cleanliness—and watering. I make it a rule to go through my collection once a month with a camel's-hair brush for the dust and green-fly, and a pair of scissors for the dead and decaying "grass." By thus frequently going over the plants, I am enabled to detect and arrest the ravages of the maggot, and see at once when a plant looks unhealthy. Watering is *the* important point, and it is here where the beginner is apt to be too enthusiastic. A proper knowledge of how to water is only gained by experience. I believe it as much a mistake to leave the plants too dry as too wet, and have found that they suffer equally in frosty weather. If the plants are allowed to get too dry, they become of a yellow hue, as if they had lost their sap; and if they are kept too wet, sooner or later

they damp off. Never, during the winter, let them get wet overhead, as there is very little chance of drying the grass for some time, and, as a consequence, spot makes its appearance. The beginner, therefore, should try and hit the happy medium, and, if he takes a real interest in his plants, he will soon learn what are their different requirements.

Severe frost I guard against in the earlier winter months by covering the frames with mats; but by the time the pots are full of roots I do not find it does much harm; but even then I think "prevention *easier* than cure," and act accordingly.

In the month of December (generally the 26th), I get together the potting compost in a dry shed; and make it up as follows, viz., three-fourths good brown loam, and one-fourth leaf-mould, road-grit and cow-manure in equal proportions. I do not use much manure, and do not advocate it, because I consider that if the loam be "maiden," it is quite strong enough; and what feeding is required I do later on, as will be presently described. Last year I used in my soil something like two barrow-loads of *fresh* broken oyster-shells, and consider it had such a beneficial effect on the blooms that I am using it again this year. The compost is turned over at intervals until each ingredient is thoroughly incorporated one with the other.

On the 1st February, if the weather is not

frosty and the plants not frozen, I commence to transfer them to their blooming-pots; but here let me say that I should not do this if I had not frames and houses wherein to put them, although I am convinced of the good effect that early potting has.

I use pots of 6, 7, 8, and 9-in. diameter. If the pots are new they are thoroughly soaked to get the dryness out of them: if old, the pots are thoroughly and carefully cleaned. I place about two or three inches of crocks (not too small) at the bottom, and cover them over with dry leaves. I then fill the pots about three parts full with the blooming-compost, putting into each pot, as I proceed, a handful of finely broken charcoal. The plants are gently tapped out of the small pots, and placed on the soil, and the spaces between the plants, and to within half an inch of the rim, filled in with more soil, and the whole thoroughly shaken down and pressed firm. I never place different varieties in the same pot, for there are but few sorts that require the same treatment. I invariably put three plants in a pot, according to size and growth; for instance, "William Skirving," P. & P. B.—with me a very vigorous grower—three plants in an 8-in. pot; "J. D. Hextall," C. B., naturally small in growth, three in a 7-in. pot; "Muriel," H. P. Pic., three in a 6 or 6½-in. pot; these small but important details

the tyro will learn by experience. I favour much tight-potting, and for several reasons: first, because I think plants whose roots are confined give better results than those that never reach the sides of the pots; and, secondly, because a greater number of plants can be grown in a given space; and this, to a small grower, is an all-important factor.

As each pot is finished, I place on the surface one or two small oyster-shells, whereon is poured the water from the spout of the watering-can, thus preventing those unsightly holes in the soil which would be caused if the shells were not used; the pots are then placed in the cold frames and treated in the same way as before, with this exception, that the frames are now turned to a northern aspect. As the month of April goes out, the plants are placed in the open, with full exposure to sun and light. In May, as the flower-stems begin to lengthen, the blooming-sticks are placed to the plants, and in June the flower-stems must be neatly tied as they rise. During these two months I pay great regard to cleanliness: in keeping down the green-fly, in weeding the soil, in cutting off the dead "grass," and also taking off the side-buds as they appear. Top-dressing I consider a waste of time, and do not practise it. I only grow one bloom on a plant, and about the beginning of July, or earlier, this bud (the main one) begins to get an absorbing object for the grower's attention,

It must be eased on one side, the points of the calyx must be turned down, and, if inclined to burst, must be lightly tied with a piece of raffia, and green-fly must be brushed off if the bloom is to attain perfection. As the bud commences to swell I give a dose of well-diluted liquid manure two or three times a week; and as I know the soil has not been highly stimulated, I am able to give my plants more than I otherwise could.

When the blooms begin to show colour I move them into the Carnation-house, where they are safe from rain. As the show-day approaches, the blooms must be retarded or quickened as may be required; although, if the weather is dull and cold, it is a difficult matter to make them open quickly. It is easy to keep back early bloomers by moving them into a shady corner; and I have kept back blooms of "Sybil," R. F., in this way for three weeks, and then used it for exhibition. I generally cut my blooms for the show two days before, and place them in water, as by this means they become easier to "dress." The art of "dressing" Carnations is one that not many growers are masters of; many persons over-dress; and what is the consequence?—the blooms do not last. I have seen many of my own blooms go over from that cause, so that my advice to the beginner is to moderate his zeal in this respect, and "under-dress" his flowers.

Never attempt to "dress" a half-open flower—it is impossible. If I am in need of such a flower, I take it with me, and often before the judging commences I have been able to utilise it. As to the necessity of "dressing" Carnations, I am not going to discuss it here. I will only say this, that the beautiful markings of the Carnation cannot be discerned till you commence to dress it, and the beauty of the Carnation is not seen till it is dressed.

As the plants go out of bloom, they should be at once placed in the open, and, if the young growths are ripe enough, at once layered; if not sufficiently matured, they should be placed in a warm corner, where they are likely to grow more freely. I layer early, and like to finish by the second week in August.

For layering, I use hair-pins, and bend them up in the form of a hook; they answer the purpose well and are cheap.

Having prepared my layering-soil, which consists of sand and peat in equal proportions, I take out an inch of the old soil and replace it with the new. I select a ripe joint, and having made the necessary cut, bend the layer until the joint is well open, press it down in the soil, and peg firmly. The layer is propped, with a crock or piece of brick, into a perpendicular position, and then watered with the rose of the watering-pot.

When the layers are well rooted I take them off, and proceed to pot as before described.

In the foregoing remarks, I have done my best to give a clear and succinct account of my method of growing the Carnation for exhibition. It must be borne in mind that I am living in the most southern town in England, and the fact that our seasons are, of necessity, earlier than in more northern districts will account for my being more forward in my processes of culture than is usually supposed to be right and proper.

The number of each variety that I grow varies considerably, and depends mainly upon the regard I have for them; but I may say, roughly, that I grow from twenty to thirty plants of the leading sorts, and the duration of the bloom is lengthened to such an extent by careful attention to the situation of the pots that I generally manage to get enough blooms to exhibit at the principal shows.

THE CARNATION IN THE MIDLANDS.

By R. Sydenham.

Having been asked to contribute to this Manual some notes of my experience as a Carnation grower, I submit the following with a hope that it may encourage some to take up the cultivation of the Carnation and Picotee who think they will grow only in pure country air. It will be found that with ordinary care they will succeed as well in the neighbourhood of large towns as in the country, as is shown by so many fine flowers coming from the neighbourhood of Clapham, Manchester, Bradford, Sheffield, Birmingham, &c., grown in gardens practically surrounded by houses or manufactories. At the same time, it is well to point out that success on the exhibition table is not acquired without work, and love and enthusiasm for that work.

My enthusiasm for these flowers began from seeing two fine collections, and admiring the great attention the owners bestowed upon them; and my ambition was aroused to possess such a collection. I found that the best way to acquire the necessary information was to visit all noted trade and amateur growers when opportunity offered.

The major part of my theoretical information has had to be acquired after 8 or 10 p.m., or before 8 a.m., being much occupied with business during the day.

My first plants were bought in the spring of 1886; and were planted in the open borders, but did little good, as the wire-worm destroyed them nearly all. The following year I got another and larger assortment, and had a house twenty-eight feet by nine feet built for them, where the top and side lights could be removed at will. There is a path in the centre, and then a kind of small frame, about nine inches high and three feet wide, on both sides. These frames are tiled at the bottom with square, flat bricks. The advantage of the frame is that it shields the pots from the cutting winds in the early spring, and allows of damp cocoanut fibre, or other materials, being kept round the pots in very hot weather. Since that time I have gradually increased my collection, and now have three houses for them, usually flowering from 1,200 to 1,500 plants, in a garden one-and-three-quarter miles from the centre of Birmingham, practically surrounded by houses, and where the air is often thick with smoke, for the block forms a kind of oblong quadrangle, my garden being situated near the end of one of the long sides. I prefer ten-inch pots to smaller ones for all vigorous growers, usually putting three or four

plants in a pot; of the weaker-growing varieties I plant two or three in an eight-inch pot, and condemn very firm potting, as experience convinces me it is not necessary or desirable; but, of course, this will depend, to a certain extent, upon the nature of the soil, and at present I cannot see any difference in using large pots or small ones, except that I think the plants in small pots often bloom earlier than those in large ones, but the plants in the larger pots make stronger growth. More, however, depends upon the soil and the watering than the size of the pots. The composition I now use is a rich, heavy, yellow, loamy turf-soil, from the neighbourhood of Kettering. To four parts of this add one part of old leaf-mould, one part of sea-sand (I fancy the salt in this sand very beneficial), one part of old, well-rotted stable-manure, and half-a-part of mortar obtained from old buildings, and, where it can be had from old chimney-stacks, with a little soot, so much the better. The mortar rubbish, I believe, gives a purer ground-colour to the flowers; the soot imparts a dark rich colour to the foliage, and drives away worms and other pests. This compound I usually prepare two or three months before wanted, and have it turned over frequently to get it well mixed and sweet. I like good drainage, but at the same time provide a certain amount of food amongst the drainage by using a few crushed

bones, a few bits of old mortar, and some charcoal. Bones, I believe, have the effect of giving a rich brightness or denseness to the colours. I advise all to shift their plants into their flowering-pots as early in the spring as possible, beginning about the middle or end of February, as weather permits, as it checks the plants very much to disturb them when in active growth, or when the small pots have got too full of roots. Water the plants well a day or two before this re-potting, and have the fresh soil just damp enough to hold together if taken in the hand and squeezed. The plants, when re-potted, should be kept close and free from frost for ten days or a fortnight, and water should be sparingly applied until they become established. Of all things, be careful of over-watering, as more plants are lost from over-watering than under-watering. I spoilt the best part of my collection on one occasion from over-watering early in the season. The plants, after repotting, will want but little attention until May. The surface of the soil must, of course, be kept clean by stirring once every two or three weeks, dead foliage must be removed, and green-fly, maggot, or wire-worm carefully watched for. The green-fly can easily be brushed off with a small camel-hair brush, or, if allowed to get very numerous, I advise laying the pots on their sides, and well syringing the plants with hot water, mixing with

it a little soft-soap. The water should be heated to about 100 degrees. The presence of the maggot may with a little experience be easily detected, and it must be diligently hunted and destroyed. The plants, during the early spring, must be protected from cutting winds, as they do more harm to Carnations and Picotees than any amount of frost. I usually protect mine by putting up the side-lights of the houses, or by using a rather fine shading material. Stake the plants as early as they require it, using green-painted sticks in preference to white ones, as being less unsightly. Place one good tie near the bottom to hold the stems steady; they will only want one or two more ties, which can be made so as to slip up the sticks as the stem grows. Where fine exhibition flowers are wanted, take off all the buds except two or three on a stem, and cut out any but the one main stem to each plant; and in varieties that have a tendency to split their calyx, tie each bud with fine raffia, or put a small elastic band round it. Preparing for exhibition will be the next interesting, if not exciting, event to think of. Experience is required to see when a bloom is at its best, and care must be taken to select the flowers that have the whitest grounds and the clearest markings. Flake and Bizarre Carnations should have the stripes as well defined and as long as possible.

Picotees should have no bar running from their circular or marginal markings; the petals should be of good substance, well rounded, and with smooth edges. A ragged petal is a defect in the eyes of a good judge, who looks for quality in the form of each petal, and a clear ground and definite markings are regarded before size, although where quality is equal the largest flowers will, of course, come first. The dressing of a Carnation or Picotee, although condemned by some, is very desirable to bring out the beauty of the bloom.

When exhibitions are over, and the flowers are passing out of bloom, layering should have immediate attention, for the earlier this is done the better and the quicker will the layers be rooted, and ready to take off for putting into their winter quarters. Before starting to layer, I strongly advise removing the top inch or two of the old soil, and putting a composition of leaf-mould and sea-sand, and shells broken very fine. I say sea-sand and shells, for the salt and lime they contain acts as a great stimulant, and strengthens the young layers. Such, at least, is my experience since I adopted it. Formerly I used fern-pegs for layering, but now get an improved galvanised flat-wire-peg, with a little handle at the top, at 1s. per hundred. The advantage of these pegs is that, having a little handle, they are not so liable to hurt the hands as the ordinary hair-pins or bracken fern-pegs.

They are easily taken off, thereby saving many plants from being broken when ready to be removed; and, inasmuch as they can be used for two or three years, if kept clean, come as cheap as anything. Do not trouble to layer any small or weakly growth, unless of a new or scarce variety, as they so often go off, or make such weakly plants as not to be worth saving. After layering, the young plants should be kept fairly moist, by spraying them with a fine-rose water-pot once or twice a day, according to the state of the weather, as they should never be allowed to droop from want of water. Take off the layers early in October when well rooted. Some prefer potting each layer in separate pots, but I usually plant a pair in a 3½ or 4-inch pot, and keep them in a cold frame with plenty of light all round them, and the frames opened on all days except very frosty ones. Water very sparingly during the winter, as too much water has a tendency to develop spot, one of the worst diseases Carnations are subject to.

I strongly advise everyone to get the plants they want to complete their collections in the autumn, instead of the spring. They get better acclimatised to their new home, atmosphere, &c.; fewer plants are lost, and they bloom much stronger than when shifted in the spring.

Raising new varieties from seed is a very interesting and fascinating pursuit. Great care should

be taken to save seeds only from the best-marked flowers and strongest plants, keeping a record of the parents of each pod of seed; I strongly advise those, however, whose space and time are limited to content themselves with getting plants of the new varieties as they come into the market, for it requires considerable experience and care to produce flowers which would equal, much more surpass, standard varieties.

As to the best varieties to grow, I recommend all to attend as many exhibitions as possible, and there note those that are shown best and most frequently, and never be afraid to ask advice of anyone who can give information; for Carnation-growers, as a rule, are a most genial class of men, always ready to give any information in their power; but for those who have not time for this, I refer them to the lists given in this "Manual," which are the selections of the principal growers, arranged in their order of merit.

DRESSING AND STAGING THE CARNATION AND PICOTEE FOR EXHIBITION.

By Benj. Simonite, *Sheffield.*

The success of the Exhibitor largely depends upon the care and thought bestowed on dressing and staging his flowers.

It is useless to deny that honest and proper dressing is a fair and lawful advantage to the florist's Carnation and Picotee.

In these every petal is of note, and a picture in itself, and is therefore to be displayed to best advantage, the judges having no time to hunt for hidden beauties. Neither do they expect that disqualifying petals should be concealed, instead of being pulled out.

Very little observation is enough to show that the Carnation and Picotee will often so lay several petals one over another that none but the one happening to be uppermost can display its markings, while those underneath can produce little effect beyond making the flower look lumpy.

No one finds fault with the beautifully displayed petals of the old double white Camellia, or those in a well-formed bloom of the florist's Dahlia. These fall naturally into their best

position, and by their stiffness stay there. But the long-necked, movable petal of the Carnation is so easily either mislaid or displaced by the wind as to hide more or less of its proportions and beauty, several deep under other petals.

Nature, therefore, having done her part, it remains for us to commence where she has left off, or has been ill-treated by rude winds; and to bring to light all the beauty of the flower, placing each petal in its best attitude and position, and arranging the natural gifts and graces of the flower, so that all the most finely marked petals shall be displayed to the best advantage.

The skilful dresser naturally has the advantage over the man who, for want of eye, judgment, forethought, patience, taste, delicacy of touch, "can't get into it," and therefore says, "Abolish dressing!" He is much the same kind of objector as the tailless fox, who did not like to see other foxes possessing what he had not got, and so said to them, "Abolish tails!"

The novice, in this as in any other line of study, art, or pleasure, may expect to have to learn by experience. Of course he will be at some disadvantage. It is not for skill and experience to come down to his level: he must work up to the level of experience and skill. He will soon be on the way to this if he is a plucky, patient, watchful man; true, and not shallow and

changeful in his fancy for the flower. Even the novice may do much (he can hardly help doing something) to improve his flowers, and present them on the exhibition table in better form than when cut from the plant.

By the time the flowers are coming into bloom, and the day of the exhibition is drawing near, the stands required should be got ready, and two pairs of tweezers be at hand. One pair, made of ivory, will be needed for dressing; and one pair of steel ones is wanted for turning back the segments of the calyx or "pod" (which is a technical, but inaccurate term), and also for pulling out defective petals.

Defective petals are those in the centre of the flower which are very narrow, curled, and "strappy," often otherwise deformed and short of colouring character. So also are all self- or one-coloured petals in a Flake Carnation, or a flake petal in a Bizarre Carnation. No petal is admissible that is devoid of white. Where the essential white or ground-colour is wanting, the petal or the whole flower is termed a "run" petal or flower. In Picotees a petal with a "bar" or stripe, deeper into the petal than can be allowed by the character of its "edge" colour, is a weakness the greater in its proportion according as it strikes out of bounds down the petal. "Run" petals that occur occasionally in Picotees, and more frequently in Carnations, must of course be removed.

For exhibition purposes there will also be required cards of two sizes—the larger size to place under the flower to arrange the petals upon; the smaller cards to place under the larger ones to hold them in position.

The larger cards must have a round hole punched in the centre, sufficiently large not to touch the calyx or pod, otherwise the free movement of the petals will be interfered with, and the flower have the appearance of being throttled.

The smaller cards must be cut with a star-shaped pattern in the centre, the points of the star, as the flower-stalk is passed through, will bend outwards and downwards, and bind gently on the calyx sides, and thus hold the larger card above in its position.

All being in readiness, look the collection over, and if for a stand of twelve blooms, cut two of the best flowers in each of the six classes, and begin to dress them.

Take a flower in hand, and with the steel tweezers turn outwards the top of the calyx; this allows room for the petals to move easily from side to side. Then pull out all "run" or deformed petals, place a card of the larger size under the flower, and with the ivory tweezers arrange the lower row, or "guard petals," upon the card; at the same time drawing them gently, but not too far outwards, towards the edge of the card.

This gives size to the blooms, and allows room for other petals to show their qualities.

The second row of petals should be laid over the edges of the two underneath, so as to cover their divisions—the third row over them in like manner, till the centre of the flower is reached. This may appear very formal work on paper, but it is not so with the ever-varying grace, and play, and variety of the petals to take off the stiffness. Of course, a flower may be pulled about and over-dressed, as by straining petals to gain apparent size, but by simply arranging the petals so that none are lost sight of, no violence is done to Nature.

Where masses of colour lie much more heavily on one side of the flower than the other, some petals may be carefully transposed, and the colours thus more effectively distributed over the flower.

The last delicate touch is to arrange three or four good petals to lie with easy grace over the centre of the flower.

This requires care and some practice, and, like all things done with grace and ease, looks much easier to do than it really is. Done with a master's touch and eye, it has not the slightest appearance of force and artificiality. These three or so top petals will seem to have gently and gracefully laid themselves in natural repose in the position left for them, and no doubt give that fulness and smooth perfection to the flower, which it cannot display

with its blossoms knocked about in the wind and rain on a garden border.

All handling of the petals must be with great care not to split, or bruise, or nip them.

I have seen whole stands of flowers so badly mutilated that they had no chance in any keen competition.

When the dressing is completed, arrange the flowers in the stands—commence with the back row, and place the best flower at the left-hand corner. Remember, that the best and most emphatic position in a row is the left-hand corner always, and the right-hand corner the place that catches the eye the least; for, as in the act of reading, the eye, as it were, skips lightly from the end of one line of words, and seeks and lights strongly on the first word of a new line—so your best flowers should most strongly catch the judge's eye. Let your weaker ones take the forlorn hope of being where the shadow of a chance lies that they may get off as easily as possible.

The largest flowers should be in the back row, falling off gradually (if you cannot keep the size up), placing the smallest in the front row, so that the difference will not be so perceptible. There is something to gain or lose in arrangement.

CALENDAR OF OPERATIONS FOR EXHIBITION CARNATIONS AND PICOTEES GROWN IN POTS.

By J. J. Keen, *of Southampton.*

No hard and fixed rule can be laid down for the culture of the Carnation, as so much depends on the incidence of the seasons, and, therefore, for that reason, a calendar of operations must not be taken too literally, and due allowance must be made for differences of season and climate in the North and South of England. A calendar is as a sign-post to a wayfarer in a strange land, and is not intended for a traveller who knows the road.

JANUARY.

In January growth is at a minimum, and but little attention is needed, cleanliness and watering being the chief points. As to the desirability of protecting the plants in frosty weather a difference of opinion exists. Here, again, no rule can be laid down. If the soil in the pots is dry, no amount of frost will do any damage; but if the grower should have been tempted to water his plants, then it is imperative that the frost—as far as possible—should be kept away by coverings of mats.

Generally when plants suffer from frost or damp in the winter, it is because of their imperfect rooting, which renders them unable to stand the extremes they are subjected to. Losses are sure to take place in the best cultivated collections, and the young grower must not lose heart if he sees some of his plants fading away. Many causes may lead to such losses, especially if new stock has been acquired;—difference in methods of culture, different climatic influences, bad and weakly growers, late potting, and so on. It is a singular thing that plants obtained from the North of England are, for the first year, invariably later in blooming and growth than those procured nearer home. One would naturally expect them to make an earlier growth, under the influence of a warmer climate, and I can only account for it by supposing that they need time to get acclimatised.

Complete the preparation of soil for the blooming-pots, keeping a sharp look-out for wire-worm, etc., when turning it over.

FEBRUARY.

Prepare the pots for blooming, and commence to get everything in readiness for potting. Still go over the plants constantly, keeping them clean and attending to their wants. Replace all losses by despatching orders early, and, whenever possible, stipulate that they be delivered in their winter

pots. If the weather is favourable and genial, potting should be finished this month. Much, however, depends upon the weather, and the conveniences the cultivator has for placing his plants when they are potted. If compelled to place in the open at once, it will be better if left till later.

MARCH.

Re-potting should be finished this month. If the soil used for blooming is moist, no water will be required for a few weeks. Shield the plants carefully from cold and biting winds till they get fairly established; keep the rain from them for some time longer.

APRIL.

Tie the early and tall growers to the sticks as they advance in height, as the plants are very easily broken off by high winds. Keep the foliage from green-fly, remove decaying leaves; and where plants have been protected in frames they should now be placed out in the open to the full exposure of sun and air.

MAY.

The plants will be growing rapidly now, and the flowering-stems must be carefully tied as they advance. Do not tie too tight, or the stems are liable to snap off. Disbud as soon as the young buds are large enough to handle. Watch the weather carefully, and if dull do not over-water. Weakly growers

make little headway if this rule is not observed; they grow, it is true, but make few roots, and the consequent result is small flowers, or, just as the blooms are opening, wither and die, as if the plant had done what it could and succumbed.

Weeding the soil must be attended to, and scrupulous cleanliness must still be observed if a fine bloom is to be expected.

JUNE.

Tie the flower-stems as they need it; disbud as required. Having always grown for exhibition, I only leave the main bud; but this rule cannot be laid down as a fixed one, as I have found some varieties lose refinement if allowed to throw all their energies into one bloom. The Self varieties, mostly, are liable to grow large and out of character, and therefore, where the flower is known to be large, two or three buds should be left. All side-shoots running for bloom should be stopped, thereby causing the stock to be stronger. Carefully watch for green-fly and brush them off. If the weather is dry and hot, syringe the plants, thus keeping the young growth free from dust and dirt. Weak varieties should not be subjected to too much of this treatment, and must be taken away from the general collection and placed on one side, where they can be attended to individually. Use sparingly weak liquid-manure as the buds swell.

JULY.

This and the early part of next month is the florist's paradise. The plants should be placed under cover without delay. Watch carefully for green-fly, and brush off all that can be seen on the bud. Many a fine bloom has been spoilt by these pests getting under the points of the calyx, where they are very difficult to dislodge. Where it is seen that the layers are ripe enough, they should be promptly put down, as they become very hard if left too long. The plants will be taking a great deal of water now, but still it must not be overdone.

AUGUST.

As the plants go out of bloom they should be placed out of doors. It is not well to layer directly after removing them from their blooming-quarters *under glass*, as the grass has become soft, and requires a few days' exposure to the air before it is done. All layering should be finished by the third week if possible. Layering is the most important operation of the whole year, and it is necessary it should be done early for the production of fine plants for next year's growth. Careful watering will be needed when the plants are layered, and they should not be allowed to become dust-dry, or the emission of roots will be impossible. The latter part of the month will be a quiet time, and opportunity should be taken to put away the

blooming-sticks, cards, pins, blinds, etc., for another year's use. Generally prepare the soil and pots in which the young stock is to be wintered.

SEPTEMBER.

Supposing the reader to be a new aspirant for exhibition honours, he should endeavour to procure the stock he intends to grow the latter end of this month, which, if the season is an early one, he should have no difficulty in doing. In choosing his varieties, a careful study should be made of the names of the flowers appearing in the Exhibition reports, or in the various lists given by practical writers in this "Manual," and which can be had from some of the florists and nurserymen who make the Carnation a speciality. Some of the varieties he may be unable to obtain, as they are difficult to increase, and owners may be, in consequence, loth to part with their stock. He should not, however, be discouraged, as a good start can be made without them.

Having received his plants, they should be potted without delay, and kept close in a frame in a shady place for a week until the roots catch hold of the soil. To those growers who layered early, the potting of the plants should be finished, if possible, this month.

OCTOBER.

Those who have not yet finished potting the

layers should see to it at once. Severe and inclement weather sometimes sets in this month, and it is difficult to get the plants fairly established. If such is the case, the young grower must complete the purchase of his stock by the second or third week; and as the plants already potted are getting hold of the soil day by day, as much air should be given as possible. Cut off dead and decayed leaves, brush off the green-fly, and keep as clean as possible. Water sparingly, and do not expose the plants to the rain. Where the stock on old plants and scarce varieties was too small to be layered, take the old root from the blooming-pot and plant in the open. I have had many strong plants the following season from such a mode of procedure.

NOVEMBER.

The work of the cultivator will be at its minimum this month, although for the earnest grower there is always plenty to be done. Water the plants as they require it, but closely observe the atmospheric condition of the weather. If damp and foggy, no water will be required, and the plants in such weather will go a long time without it; if the wind is drying and keen, more water will be needed, and they should have it, as it is equally detrimental to the health of the plants to be kept too dry as too wet. Give all the air possible, carefully screening from bitter winds. Keep the plants

scrupulously clean from dust and green-fly, and watch carefully for the dreaded maggot. About the end of December commence to get the soil together for the blooming-pots; the different ingredients require to be well mixed, and if prepared early can be turned over at leisure.

DECEMBER.

Same instructions apply as for November.

THE CARNATION IN SCOTLAND.

By M. Campbell, *Auchinraith, Blantyre.*

The history of horticulture in Scotland affords no more striking example of the power which certain plants possess in reaching the public taste than is found in the Carnation.

By its symmetry, compactness, delicacy of petal, and great variety of colours, its utility for bouquets and filling glasses, etc., the Carnation has laid hold of the public to an extent never before known in the history of horticulture.

Its popularity is unquestioned, and is still on the increase. A few years ago Carnations, as shown at the horticultural exhibitions in Scotland, were poor, miserable things, scarcely worthy of their name. Now there is not a village show in this district (Lanarkshire) and many others where the prizes offered for them are not competed for strongly; and for quality the staged blooms would do the growers credit in any show in the kingdom. And we confidently look forward to the time when every florist, whether amateur or professional, will consider his garden incomplete without a bed or two of these beautiful flowers.

The object of this manual is to further develop the love of these flowers by placing before the public the methods of cultivation practised by the largest and most successful growers in this country.

With these prefatory remarks I shall now proceed to give a detailed account of the mode of culture generally pursued in Scotland. And as there is very little done in Scotland in pot culture, my remarks will almost entirely apply to their cultivation in the open ground.

SOIL.

A good medium loam I consider the best, rather inclining to heavy than light. As soon as the ground is cleared in the autumn, let it be turned over two spades deep and thrown up as rough as possible, so that the action of the frost may pulverise it. In the beginning of February take a favourable opportunity of giving the beds a dressing of manure (old hotbed for preference, or moss litter which has been used for bedding horses, will do very well). Avoid everything in the way of new or rank manure. If adding turf, beware of wire-worm, for if a few of these pests get into the beds they will work sad havoc amongst the plants. I used to be very much troubled with them, and attempts to trap them proved of very little use. As prevention is better than cure, it is wise to adopt measures to exclude them from the beds. With

this end in view I have, during the past five years, adopted the following plan, which has proved most effectual. All turf to be used for Carnations, either for pots or beds, is exposed to as much heat as will kill everything in it in the shape of insect life. This can quite easily be done without burning the fibre out of the turf. The mode of operation here is to place a barrow-load of turf in the hottest part of the flue in a house used for forcing rhubarb. Put on in the morning, it is allowed to lie till midday, when it is taken off and another put on, which is ready to be replaced with another at night; and so the process goes on until we have as much as required. I have found that it well repays all the extra trouble.

Fork over the beds at the first favourable opportunity after the manure has been put on. It may then be left till planting time, which should be as early in April as possible, when the ground should have another slight fork over, and if the grower can command a sprinkling of wood ashes or charcoal and a little lime rubbish to be forked in, it will benefit the plants very much. A great point in the cultivation of the Carnation is to have the soil sweet by frequent turnings-over and exposure to the action of the atmosphere. In sour or pasty soil they will not thrive.

Having now the bed all ready and in good order, get the plants in as early in April as possible,

as it is hurtful to them to be confined in small pots after that time.

PLANTING.

The usual practice here is to plant in beds four feet wide, and one foot between the plants, which gives ample room for getting the grass laid. With a planting-trowel make a hole to receive the plant, turn out of the pot without breaking the ball, place the plant in position, and, with the hand, fill in the soil round the roots, pressing it moderately firm, smooth the surface, and give a good watering after the bed is finished. Very little will be required for a considerable time after, but should the weather continue dry they must on no account be allowed to suffer for the want of water. An occasional stirring of the surface-soil will also benefit them very much during the growing season.

CHEMICAL MANURES.

During the last few years I have experimented with a great many of the chemical manures which are in the market, but I have found nothing that the Carnation likes better than soot. About a month or six weeks after planting I invariably give the beds a good heavy dressing of soot, put on broadcast either with the hand or trowel. It will do no harm to the plants even though it may be newly out of the vents or flues, and the foliage may

be covered with it. Immediately give the beds a good watering with watering-pot and rose to clean the foliage; the water will carry some of the soot down to the roots and stimulate the plants. They will assume a darker green colour after it.

Attention will now be required to staking and tying as the flower-stems run up. Also keep a sharp look-out for green fly, as they are generally very troublesome about this time. A dusting of tobacco-powder, or a watering with soft soap and water, will generally get rid of them. My own practice is to dust with tobacco-powder, and in a day or two to water them overhead with the following mixture: one pound of soft soap and half a pound of sulphur to sixteen gallons of water, put into a boiler and boiled for two or three minutes. And I may also here state that should they be attacked with fly in the frames in early spring, as they very often are, if the plants in pots are dipped overhead in this mixture at 120° Fah., it will effectually clear them of green-fly without the slightest injury to the plants.

As soon as the buds are far enough advanced, disbudding will require to be attended to. If the blooms are wanted for competition purposes, from one to four will be sufficient to leave on a stem; if merely for decorative purposes, then from four to a dozen buds may be left, according to the strength of the plant.

LAYERING.

About the beginning of August the grass will be getting ripe for layering, and if this operation is delayed the stems get hard and do not strike freely. The operation is very simple, and anyone with a little care may soon become expert at it. With a sharp knife clear away the foliage from the under part of the layer up to the third or fourth joint, counting from the top. Insert the knife under the joint, cutting half-way through the stem, running the knife up the stem about half an inch; bend up the layer till the joint-cut is quite open, then press gently into the soil, when it can either be secured with a peg or kept in place by putting some more soil about it. I may say here that I never use a peg when layering in the open ground. I occasionally find them necessary when layering in pots, as in the limited space one cannot get sufficient soil about the layers to keep them in position. Galvanised wire pegs can be got which are made for the purpose. Willow twigs do very well, or, better still, the stems of the Common Bracken (*Pteris aquilina*). The compost used here for layering is one barrow-load of river sand and one of cocoa-nut fibre to three of light garden soil, all passed through a half-inch riddle. After layering has been completed, give water with a fine rose, to thoroughly soak the soil about the layers; and should the weather continue dry, they will require

constant attention with water, for if neglected and allowed to remain dry they will make no progress in the way of rooting.

POTTING THE LAYERS.

October is the month for this operation, and if they have been properly laid and attended to they should now be in fine condition for putting into their winter quarters. They can either be potted singly in $2\frac{3}{4}$ or three-inch pots, and plunged in cocoa-nut fibre, on a bottom of ashes in cold frames, or planted out in the frames. The general practice in this district is to pot the finer varieties and plant out the commoner sorts. I find that plants of the same variety turned out of pots bloom a few days earlier than those that have been planted out in the frames; which shows that the less the roots are disturbed in the spring the better. After potting, water, and keep the frames closed for a few days. Then give plenty of air, pulling the sashes off on all favourable occasions. Never leave them without air all the winter, unless in the very severest weather, when the sashes may be closed, and they will need no other protection, as they will stand the severest frost if protected from cold cutting winds. Very little water will be wanted through the winter season, but should it be necessary, choose a favourable day and water in the morning, giving plenty of air afterwards to

dry the foliage. Carefully guard against the soil in the pots getting saturated with heavy rains, as it is very detrimental to the health of the plants.

I am of opinion that most of the varieties of Carnations would stand the winter in the open ground if put in in time to get a good hold of the ground before severe frost sets in, say not later than the middle of September—earlier if possible. However, as I have only tried the experiment for the first time this last autumn, with about one hundred varieties, I cannot speak on it with confidence. At the same time I may say that at this date, February 8th, they look as well as anyone could wish.

Carnations "sporting," or the running of the colours of the flowers, is the cause of a great deal of disappointment amongst growers—Bizarres coming without the white ground; Flakes coming self. This is a difficulty which has always existed, and apparently cannot be got over, so far, at least, as my own observation goes. I do not think soil has anything to do with it. I grow about one hundred pots every season for seed purposes, generally three plants in a pot, and in many cases one will be run, and the other two quite correct, although all the three have been saved from the same parent. There is the same tendency to sport in the Fancy Dahlia.

SEEDLINGS.

In all probability the branch of his calling which most engrosses the attention and arouses the most lively interest of the true florist is the raising of seedlings. As the buds break into colour, the early morning finds him bending affectionately over a bloom which, in his sanguine moments, he anticipates will turn out to be superior to anything yet produced. Visitors are requested to look over the beds, and opinions and speculations are freely indulged in as to the respective merits of the flowers. Points of difference and resemblance are noted and discussed. Indeed, the consuming interest centred in a bed of seedlings can only be equalled by the care which should be exercised in their raising.

The method followed here in the raising of seedlings is to sow the seed early in February, place them in a gentle heat, and as soon as they are forward enough to handle they are pricked out into boxes and placed on the shelves of a greenhouse near the glass for six or eight weeks, when they are removed to a cold frame. About the beginning of June they are nice sturdy plants, and are then planted out in beds in the open ground and watered. All the care they require for the season after that is to keep down weeds. By the end of the autumn they will have grown into nice bushy plants from six to ten inches

across, and a few of them will probably have thrown up a flower-stem; and, if wanted, they may be carefully lifted and potted, and placed in a greenhouse, where they will bloom through the late autumn and winter. The plants in the seed-beds will stand the severest winter without the slightest protection, unless rabbits are about; if so, they must be kept out with wire-netting, or they will certainly find their way to the Carnation beds.

The following summer the plants will send up on an average from six to twelve flowering stems, when they will require attention in the way of staking and tying. As it would be an enormous labour to tie each stem singly, the plan I adopt is to stick in small pieces of branches through the beds, about two and a half feet high, with the twigs on them, and run strands of raffia matting loosely round them. About the beginning of August the raiser will begin to have his reward—not a few straggling flowers, but the beds a solid mass of bloom in almost every shade of colour, where you may "cut and come again" without making any apparent difference in the appearance of the beds. If the seed has been genuine, the grower may reasonably expect something really good amongst them; but if he has had only the ordinary cheap seed that is usually sold, the "game is not worth the candle."

THE CARNATION IN SCOTLAND.

By Robert P. Brotherston.

Within the last few years there has been in Scotland a very decided increase in the cultivation of the Carnation.

This is alike noticeable in the larger gardens, where Carnations have always been more or less grown, as also in the ever increasing number of small private gardens.

An annual flower show has long been in every fair-sized village in the south of Scotland a standing institution. French Marigolds with sharply defined markings, Asters and Pansies of the newest and best varieties, were the principal flowers exhibited; but lately, wherever Carnations have been allowed a fair field, it is evident that they are gaining a rapidly increasing favour.

Six or seven years ago anything almost would do to exhibit in a Carnation Class, but now it is by no means an uncommon experience to find select varieties well grown, well staged, and fairly well "dressed." As these shows are invariably held towards the end of August and in September, Carnations cut from plants cultivated in the open border are there in full beauty.

It has been too generally the custom in Scotland to leave the layers of Carnations attached to the parent stock during the winter, and to take them up and move them into their flowering quarters in the spring; but I am glad to say that this method is falling into disuse, and the advantages of autumn planting are becoming more generally known and appreciated.

I am inclined to think that the cultivation of the Carnation, especially as a florist's flower, has reached the most advanced stage in the south-west of Scotland, but, as a rule, especially in the larger gardens, there seems but little disposition to grow show flowers. Gardeners are, of course, not altogether free to consult their own wishes in this respect, and certainly the best varieties of the Carnation fail to supply one of the great wants of a modern country house, viz., a profusion of cut flowers. To meet this requirement large quantities of Carnations are raised from seed, and when this is carefully selected I have seen most interesting and abundant crops of flowers raised from it.

Two years ago, in Edinburgh, the first prize in a class for Carnations other than of the florist's type was gained by an exhibit of blooms entirely selected from a bed of seedlings.

The pot culture of Carnations has hitherto attracted but little attention; indeed, I cannot call to mind a garden in which it is pursued except

for varieties of the Souvenir de la Malmaison type. These, it is true, are largely grown in pots; but hardly any other variety.

The very scarce Lady Middleton originated in Scotland about sixteen or seventeen years ago, as a sport from the old "blush" form. I have seen it stated that it is a sport from the deep pink variety, but this is a mistake, the late John Cowe, a most enthusiastic gardener, having secured the sport when gardener at Luffness House, East Lothian.

The deep pink form, known under a variety of names, is also said to be of Scotch extraction, having been procured as a sport a few years later in a garden near Musselburgh; but I imagine that it has sported at other places. When well grown the true pink and the old blush "Malmaison" are very fine.

In this garden many more Carnations are cultivated under glass than out of doors, and it will probably be of more interest to detail the particular methods of culture used here than to write more at large.

Carnations were with us for very many years a difficulty. The cause of failure was attributed to wire-worms: I do not know on what basis the assertion was made, but certainly I failed myself to find any of them. Various methods were tried, but with little success, until several years ago I

layered my plants in July, and planted them out, thoroughly well rooted, early in September—and since that time I have had but little difficulty, and the result has always been good.

As we grow here a very large number of plants, I have of late years cultivated them among other garden produce, and I find the potato a very good crop to precede Carnations. As the soil is in very good condition, I use but little manure; indeed, I am rather averse to using it at all for Carnations, and prefer a dressing of rough leaf-mould.

The plants are put out in double rows a foot apart, with a space between wide enough for ladies to walk without damaging the plants. The ground is not dug, but lightly forked over to get the dressing well mixed with the soil.

In April a good dressing of some "fertiliser" is hoed in; water is given about three times during the summer months, drought being very detrimental to the plants.

Strands of stout galvanised wire are, at the proper time, fixed above each row of plants, and to these the flower-stems are in due time tied. We disbud as required.

Show varieties as well as Picotees succeed perfectly, but I have by degrees done away with these in order to grow border varieties.

The only two kinds I have not succeeded with out of doors are the different varieties of Malmaison

and Germania. The plants are quite robust, but the flowers of neither stand damp in the slightest degree.

We grow a few of the winter-flowering sorts, but I have nothing special to say about their culture.

Circumstances have led me to adopt a system of glass culture which is different from anything that I have seen elsewhere, and of which it may be interesting to have the details.

It originated as follows. Finding that I lost many new varieties which were sent to me in late autumn badly rooted, I began to grow on such plants in pots; and instead of planting them out in spring, I gave them a shift and flowered them in the greenhouse.

Plants thus treated, and kept in a temperature conducive to growth, commenced flowering in May, and finding the cut flowers at this time very valuable I began to cultivate them extensively in this manner, with the result that I found myself with several hundreds of plants of valuable varieties for which I had no house-room. These I planted out, placing sashes over them, and protecting them at the sides with mats; a four-inch pipe for heating was run round this impromptu structure, and the result was so unexpectedly successful that the idea has been embodied in a permanent glass pit. This is over one hundred feet in length, by twelve

feet in width, a sunk pathway running along the middle, with beds of soil on each side.

The roof is the very lightest I could devise, and is supported by light T-iron uprights embedded in cement—kneed at the eaves—and bolted together through the ridgepiece. These give rigidity and strength to the whole structure. The sash bars are two by one and a half inches. The sides are of boarding, and are nearly three feet in height, and are constructed in such a manner that in warm weather they can be completely opened, leaving the plants practically growing in the open air, though protected overhead with glass. A four-inch pipe all round gives the necessary heat during winter and spring.

In the autumn I protect my blooms from the ravages of humble-bees by covering the open sides with hexagon netting. Hydrants and hose afford the water-supply.

The above, as will have been gathered from my description, is a span-roof building, but I also have a bed in a lean-to, late peach-house, in which the plants do equally well.

With regard to pot culture, my experience is that Carnations resent forcing, and that by far the safest plan is to give them plenty of time, but keep them moving. I do not employ farmyard manure in any form for pot culture, and feed my plants with "fertilisers." I find it is better

to use a fair quantity, and to fork it into the soil, than to apply it frequently in smaller quantities to the surface.

The only insect I am ever troubled with is a species of aphis. At no season of the year are the plants free from their attacks—they are most troublesome in summer, when the Carnations are in luxuriant growth. The only remedy I employ is tobacco-powder, with which the plants are dusted once or, if necessary, twice a week. It is extraordinary what an amount of mischief a colony of aphides will do in a short time if left unchecked.

The principal diseases I have to deal with are forms of "rust" and fungoid growth, which I attribute mainly to a cold and damp condition of the atmosphere.

The only remedy I know is to remove every bit of affected vegetation as it appears, and to keep the plants in a moderately dry atmosphere, giving plenty of air.

Some varieties seem entirely free from these attacks, others suffer very badly—"Mrs. Reynolds Hole," perhaps, is the worst of them.

THE CARNATION IN IRELAND.

By F. W. Burbidge, M.A., F.L.S.

Ireland cannot claim a solitary species of Dianthus as a real inhabitant of her mountains and shores. England, on the other hand, can boast of five, even, if not six species, and, as Mr. F. N. Williams, F.L.S., the monographer of the *Caryophyllæ*, tells us, there are not much less than 250 species now known wild somewhere or other in both hemispheres. There are actually five or six species of Dianthus found wild in the Transvaal. Mr. Williams tells us that our cultivated or garden forms of Dianthus—the genus to which the Carnation belongs—have originated by culture and selection, and possibly by hybridisation also, from five species, four of which are British or European, and one is from India, China, and Japan.

These species are:—1. *D. barbatus*, the Cluster Pink or Sweet-William. 2. *D. deltoides* ("Maiden Pink"), which is the probable origin of the Early Red Pink and the Pheasant Eye varieties. 3. *D. plumarius* ("Common Pink"), from which came the fringed White Pinks, single and double. 4. *D. sinensis* ("Chinese Pink"); and 5. *D. caryophyllus*

the wild original of our Cloves and Carnations, such as Selfs, Flakes, Bizarres, Picotees, and lastly, but by no means least, the deliciously clove-scented "Painted Ladies."

Those who are interested in the botany and in the geographical distribution of the cultivated species of Dianthus, should see a paper entitled "The Carnation as a Garden Flower," by the above author, in "Journal Royal Horticultural Society of London,"* part iii., vol. xii., which also contains the valuable literary results of the Carnation Conference. It is here enough for me to say that the Carnation was cultivated in England in the time of Edward III., and that it is mentioned by Chaucer (1386) under the name of "Clove Gilofré," "to put in ale, whether it be moist or stale." Henry Lyte, who translated the Herbal of Rembrandt Dodoens in 1578, is the first author who uses the modern name "Carnation."

On the grey limestone wall-tops of the dear old College Gardens at Dublin, I am very thankful to say the wild Carnation is happy and healthy, and blossoms profusely every year. It originally reached us from the ruins of the old Norman Castle at Rochester, sent by the hand of that horticultural "Lady Bountiful," Miss G. Jekyll, of Munstead, who has done so much for the garden-

* See also "Dianthus," by the same author, 1889.

culture and beauty of the best Self Carnations, in particular during recent years.

In itself the wild Carnation of Normandy is not very splendid, but its wild habitats, and the peculiar manner in which it haunts old ruins, may teach us a lesson as to Carnation-culture. Wild on limestone rocks and banks, it is likewise most abundant on the old keep or donjon tower of the Château Gaillard, an eyrie high up over the Seine, above the greater and lesser towns of Les Andelys, where Nicholas Poussin was born. Here, high up among the flinty masonry, the plant forms great clusters, and its seedlings grow in every crack and fissure and chink of the great walls. I did not see it in flower, but the clusters of seed-vessels rustling aloft in the warm breeze of an April day told the tale, and most assuredly bespoke a profusion of its single rosy flowers during the months of June or July of the preceding year. As I crept out at a great port-hole to see the plant at closer quarters, I could not help comparing the natural tastes of this plant with the culture it generally receives in most gardens. There was no eel-worm, nor rust-fungus (*Æcidium*), nor any signs of "damping-off" here, but every plant was fresh and sturdy, and of the healthiest colour imaginable, albeit scorched by a hotter summer's sun than ours, and buffeted during winter by every gale that blows.

Then there is another point of difference worth

remarking here, viz., that in most gardens Carnations are planted at a much lower level than the eye, and are staked up carefully so as to be seen; but as seen wild, or as naturalised on rocks or old walls, the plant is often indeed generally above one's eyes, and the masses of its blossoms hang downwards, and so do not suffer from too much rain, nor are they so liable to be spoiled by the earwigs as are our border-grown flowers.

Visitors to Italy, Switzerland, and some parts of France and Brittany are quite enthusiastic in their praises of the Carnation as there grown in pots or window-boxes at the upper windows in villages and towns. I have seen a good many window-boxes in London, but only once did I see a box-full of these flowers. It was on the upper window-sill of a sunny mews in South Kensington, and I shall never forget the sweet sight, which enhanced the delight we feel after a shower on a fresh morning in July. Here, as in nature, there was no staking, and, as seen from below, the flowers looked down into one's face in quite a friendly way. As window-box plants, the Pink and Carnation are at all times clean, fresh, and presentable, even when not in bloom; but during May, June, July, and August, or even later—sometimes until the November frosts—these flowers have no equals for form, colour, and perfume. All the species of Dianthus are happy, as either sown direct, or as

planted in autumn or in spring, on the tops of old walls and ruins, and I hope readers of these notes may try them in this way. They revel if old lime rubbish, or shell-sand, or sea-side shingle, be mixed with the loam in which they are grown.

A friend of mine in Dublin, a clergyman, once complained that no flowers would thrive in his garden, as the soil was pure sea-sand, and swept at times by the salt spray from the bay. "Try Carnations," I said; and he did so, and now has beds and borders of them fresh and healthy, and so floriferous that he confesses that he now has more flowers during their blooming season than he can use or give away, notwithstanding that the children of a neighbouring school are permitted to gather flowers for their church every Sunday during the season.

Once I walked by accident up the high terrace at Dalkey, near Dublin, and overlooking the bay, and amid a plantation of New Zealand Veronicas I suddenly came on a garden having a long bed of Carnations on the grass beside the little drive. I never saw such a sight before; and wherever soil and climate are suitable the Carnation is, as a hardy plant, a very fine and enjoyable thing. A friend from England also by accident peeped over the same low wall fringed by Veronicas a few days after I had done so, and the sight made of him a confirmed Carnation grower, and to-day he is

perhaps the best, or at least one of the best cultivators of the Carnation in England.

There are but few people in Ireland nowadays who grow the Carnation as a show flower, but you see them in beds and borders in every garden just as you do in southern England. The sweet White-fringed and Pheasant-eyed Pinks are also here largely grown for their fragrant flowers.

At Rosanna, a fine old country house in Co. Wicklow, surrounded by splendid native and exotic timber, there is a large sweep of lawn, and two long borders extend down beside a broad walk from the front door. The borders are full of early bulbs of all kinds, but the long and broad rows of old-fashioned White Pinks are something to see and remember when in flower. Behind them are great masses of the best French or Herbaceous Peonies, and I still remember the delight of Mr. Dewar of Kew when he and Mr. Frederick Moore and myself saw them in all their glory, and inhaled their delicious fragrance one dewy, sunny Sunday morning of last summertide.

It is not easy to overplant a garden with these sweetest and shapeliest of flowers. What we want are good, free, healthy sorts, clear selfs of good sound colours, and then, as seen by the hundred or the thousand, they are a sight never to be forgotten. Any variety that bleaches, as some do badly, should be discarded. We can never equal the effect these

masses or rows of one self-coloured kind give if we grow too many spotted, splashed, and streaked sorts, and mix them higgledy-piggledy together.

I shall not say anything as to varieties, as the best kinds will be amply descanted upon by those who understand them; but I should like to say a word in praise of that now nearly discarded section of Carnations called "Painted Ladies," otherwise the "Dainty Ladies" of dear old John Parkinson's "Paradisus," a work all lovers of this real old-fashioned flower should read. In that fine old folio it is called "Master Tuggy his Dainty Ladye," and is therein described as having red-flushed florets, *white behind*, the characteristic trait of all the several forms. We grow two kinds in the College Gardens. One we call our own, it having been given to me as a seedling raised in Dublin by Mr. John Somers, of Leeson Park, who was a most successful grower of Carnations on the good old florist's lines. It has long, stout, and erect grass, and bears about three flowers on a stoutish stem, these being large and very clear in colour, a sort of rosy vermilion laid on a white ground. The florets are fringed, and the fresh flowers are deliciously clove-scented. Unfortunately the plant is rather delicate, and it suffers from eel-worm, and seems specially sought out by the wire-worm as well; but it is worthy of good culture for the sake of its unique colour and exquisite odour.

Another variety of "Painted Lady" came from the Peele Park at Manchester, and is a much better grower, and flowers more freely also, than the last, although the grass is not so robust-looking, and the flowers very often sport into a darker form.

The origin of some of the garden forms of Dianthus is possibly due to the ease with which hybrids occur even in a state of nature, and there is every reason to believe that the very first garden hybrid ever recorded is that of a "Mule or Hybrid Pink," raised by Fairchild, of Hoxton, some time prior to the year 1719. This Mule Pink is mentioned by Herbert in his "Amaryllidaceæ," pp. 355 and 356, and he was no doubt correct in assuming it to have been a cross between a Pink, or Carnation, and a Sweet William (? D. caryophyllus × D. barbatus). As an instance of improvement in Pinks by crossing, or rather hybridising D. plumarius with C. caryophyllus, we have the robust and semi-perpetual race of which "Mrs. Sinkins," "Her Majesty," and some of M. Alegatière's seedlings may be named as examples. "Mrs. Sinkins" was raised by the lady whose name it bears, at Slough, as long ago as 1868, though not sent out by Mr. C. Turner until eight or ten years later, and is said to have been the result of crossing the old white garden Pink with a white Clove Carnation. It is robust

in habit, and seeds quite freely; and its seedlings come perfectly true.

A success like this ought to lead lovers of these aromatic flowers to cross all the garden forms of the several species whenever possible. How quaint and exquisite, for example, would be a double or semi-double race of the finely fringed D. superbus, or single forms varying from pure white to crimson.

I should like to ask the question, Is there anyone alive to-day who can suggest or tell us of the origin and history of Souvenir de la Malmaison, the empress of all the Carnations whatever? The name is suggestive of French influence, and perhaps some of our Continental friends who make a speciality of these flowers may kindly enlighten our insular ignorance as to the birth and parentage of so beautiful a flower? It and its sports have been popular in our gardens for many years, but we know as little of its history as we know of that of the "Maréchal Niel" Rose, or of the "Yellow Carnations," the "Mule Pinks," "Ne Plus Ultra," "Pea," or of the hundred-and-one other first-class flowers, fruits and vegetables that have slipped into existence no one knows exactly when or how.

Just now there is a good deal of argument as to the size of exhibition boards for Japanese Chrysanthemums, but I am unorthodox enough

to wish that I may never see cut blooms of any beautiful garden flower whatever so pilloried again! The whole system of showboards for Chrysanthemums, Roses, and Carnations, etc., is unnatural and wrong from all important points of view. No artist has ever yet painted a showboard full of the choicest flowers, although in the best picture shows of the year Fantin-Latour, Parsons, Moon, and Muckley, amongst others, give us natural wreaths and clusters of all these as cut rationally with a good length of stalk and leaves, and as arranged in water-vessels in a simple and sensible, because natural, way. Few hardy flowers can rival the Carnation in its graceful curves, or in its elasticity and elegance of stem, as bunches of its blooms are tied, just as cut, along with a few of their own shoots and leaves. I am not alone in thinking that a good handful of Carnations in a water-jug, or big glass jar, would set people wondering how they could have endured the showboard system so long; and the same simple plan with Roses, Chrysanthemums, Lilies, and other bulbous flowers would work a revolution in the show tents of the future, and lead to flowers being more highly valued for artistic uses than is now unfortunately the case.

In conclusion I should like to add that, in stating as clearly as I can my own thoughts on the Carnation, with hints on its origin, habitat,

history, and culture in Ireland, I, of course, respect the feelings of those who differ from my views in any way, and shall read their observations with quite as much pleasure as ever they will mine.

All true gardeners must, perforce, often differ with each other in a respectful manner, but none of us need quarrel while Flora is a Queen among us, and her Carnation beauty draws us by a single hair.

THE YELLOW CARNATION AND PICOTEE.

By JAMES DOUGLAS.

THE taste for yellow or buff-coloured Carnations has become so widely extended during recent years that it becomes necessary in a "Carnation Manual" to devote a separate chapter to this section. Some persons have an idea that the Yellow Carnations and Picotees are new to English gardens; others fancy they are tender plants requiring much nursing in glass-houses. I may say at once that the yellow colour is not new, and that they are not tender plants. The first mention of a Yellow Carnation being grown in England is in Gerrard's "Herbal," published in 1597, p. 472. At that early period the Carnation was usually designated a "Gilloflower," and after describing various coloured varieties Gerrard proceeds, "also a Gilloflower with yellow flowers, the which a worshipfull marchant in London—Master Nicholas Lete—procured from Poland and gave me thereof for my garden, which before that time was never seene nor heard of in these countries." Early in the seventeenth century it was extensively cultivated, and flowers had been produced with various markings on this yellow

ground, as we know from Parkinson's "Paradisus." published in 1629. By-and-by the yellow-ground varieties became the more popular class, and this supremacy of the yellow-ground sections was maintained until the present century. At this period Yellow Carnations were grown very extensively in Germany; and if we may judge from drawings which have been handed down to us, the Yellow was a rich gold colour, not a straw or creamy yellow. They were grown under the name of Picotees, but their markings had nothing in common with the flower we now call a Picotee. They would now probably be exhibited in that mysterious class termed "fancies," which seems to be a refuge for a host of nondescripts.

The petals, in many instances, were fringed, and marked—or "pounced" as they termed it—with lines, flakes, and spots, in the most admired confusion.

About sixty years ago, or more, Mr. James Hogg, of Paddington, was an enthusiastic cultivator of the Carnation and Picotee. He published a treatise on these flowers, which contained much interesting information on the Yellow-Ground varieties. He says they were much sought after by the nobility, doubtless owing to the patronage they received from Royal and Imperial personages. Amongst others, they were grown by the Empress Josephine, who had an admirable collection in her

garden at Malmaison in France. Who raised the first Yellow Carnation is probably not known, and the origin of Souvenir de la Malmaison—a most popular variety—seems also to be lost in obscurity. I have suggested that it might probably have originated at this residence of the First Napoleon's Consort, seeing Carnations were such a favourite flower there. The Yellow Carnations and Picotees were also at that time favourite flowers of Queen Charlotte of England and the Princesses. Hogg informs his readers that they possessed a superb collection at Frogmore, and when in flower they were the delight of all who saw them. Hogg imported a fine collection himself from the South of Germany, and gives descriptions of thirty-six named varieties. Many of us would like to possess such varieties now. There were "Chocolate and Yellow," "Pink and Yellow," "Sulphur and Crimson," "Buff, Scarlet, and Grey," "Yellow, Purple, and White," "Yellow, Crimson, and Chocolate," "Yellow, Slaty, and Grey," and some with "Scarlet stripes upon Lilac grounds." Hogg complains of the difficulty in keeping them alive in his garden at Paddington.

A very successful attempt to raise Yellow Picotees from seeds was made by a Mr. R. Smith, at Witney, Oxfordshire, in 1855-56. He exhibited some of his best flowers at a public exhibition in 1858, and won all the leading prizes. Writing in 1858, Smith states that he had been working at

them for ten years previously. He crossed the Yellow and White ground varieties together, and thus obtained good form with a well-defined Picotee edge; but the alliance of a deep yellow ground with a white would naturally produce a straw, or, at least, a pale yellow ground. He raised flowers possessing breadth, substance, and form in the petals; but a grave error was made in bringing out the pale yellow ground-colour. Smith's flowers passed out of cultivation long ago, and, unfortunately, about this time a check was given to the production of Carnations and Picotees of any colour. A new style of gardening took the popular fancy, and Yellow Calceolarias, Scarlet Geraniums, and other easily raised plants were preferred to Carnations. Twenty-five years ago only two Yellow-Ground Picotees known to me were worth growing, viz., Prince of Orange (Perkins) and Ascot Yellow (Standish). The last-named variety had a feeble constitution, and has not been seen in recent years. Prince of Orange is a vigorous growing variety, and is still cultivated in our collection, and from this all the best of the English-raised varieties have been produced. Yellow-Ground Carnations and Picotees—at least most of them—flower later than the White-Ground varieties, and in this respect are valuable as prolonging the bloom. Many of the recently introduced varieties have vigorous constitutions, and grow equally well out-

of-doors in a border of well-prepared ground, or in flower-pots to be placed under glass just before the flowers open. This brings me to a point where it is desirable to expose a fallacy in the cultivation of these flowers. Because they are grown in flower-pots some persons have arrived at the conclusion that they are greenhouse plants, and must be grown under glass before they can produce their flowers. This is an error that thas been the cause of much worry and heartburning, for some persons eager to grow their plants well have crowded them into a greenhouse amongst other plants, with the inevitable result of such treatment—spindling growths and poor flowers. The plants are merely grown in pots so that they may be placed in a light airy greenhouse when in flower; and from April to July are out-of-doors with no protection whatever. Anyone can prove the two systems of culture for themselves. Place so many plants out-of-doors in April, and a similar number in a greenhouse, and the superiority of the open-air culture will be clearly demonstrated at flowering time. Another resultant evil of greenhouse culture is the miserably attenuated young growths from the base of the plants—technically termed "grass"—and the difficulty of keeping such growths free from green-fly, which crowd upon them in a glass-house. When the flowering period is over we place the plants out-of-doors again, except such as are

required to produce seeds. These must be kept under glass, else continued wet weather later may rot the seed-pods.

We grow a considerable number of them in pots, and as many more in the open borders, and we find that some make stronger, better growth in well-prepared soil in the open garden than they do in pots. I planted out several hundred plants in a long border, well exposed to the north and east winds, so late as the middle of November in 1891. The weather was very favourable, and but few losses occurred. They are making excellent growth, and cannot fail to produce good flowers. The system of culture has been fully explained by others, and the out-of-door culture of the Yellow Carnation is the same as that required by other varieties. November is too late for planting out. This should be done as soon as the layers are rooted—say early in October—and in our heavy soil I find it is a good plan to use some compost of a lighter nature—say a mixture of two parts of loam, one of decayed manure, one of sifted leaf-mould, and a little sand. I also pass the decayed stable-manure through a sieve. This fine, rich, open compost is placed in contact with the roots, and they speedily become established in it. Those intended for pot-culture are planted in small flower-pots, and wintered in cold frames; but we are careful to give plenty of air whenever weather

permits of it. As we cannot expect that all our plants will pass safely through our changeable winters, with their alternate frosts and thaws, which sometimes throw the plants out of the ground, a few plants should be grown in pots and wintered in frames to form a reserve from which losses may be replaced; for although the plants may be removed in the autumn with impunity, they resent any serious disturbance of the roots in the spring, and if moved at that season they should be carefully transferred from *pots* to the open ground without disturbing the roots, and the soil pressed very firmly round them with the fingers. I need not say anything about seeds or seed-sowing—this has been fully dealt with in another place; but I can confidently assert that the Yellow-Ground varieties are as easy of culture, and quite as prolific, as any others, either out-of-doors or in the open garden.

TREE OR WINTER-FLOWERING CARNATION.

By HARRY TURNER.

No section of the Carnations has shown such a marked improvement in recent years as the family of the Tree or Perpetual-Flowering. Those who remember the varieties of twenty-five years ago—tall, lanky, and inelegant, spare of bloom and scant of foliage—and compare them with the best of the present day, must admit that wonders have been done with this extremely useful section of Autumn and Winter-Flowering Carnations. They commence to bloom almost before the period of flowering of the summer varieties is over, and with proper management they can be made to carry on the floral succession to April and May. A true Winter-Flowering Carnation is a plant that not only develops main stems to produce blossom, but continues to throw out lateral growths or side-branches, that in their turn furnish flowers. A model Tree Carnation is a plant two-and-a-half feet in height, bushy, with numerous side-growths springing from the main stem, vigorous in habit and profuse of bloom. It should be stated that it is mainly due to my late father that the habit and growth of

these plants have been so greatly improved, and many of the fine and striking varieties seen in the present day owe their origin to his indefatigable labour and experiments.

How should Winter-Flowering Carnations be treated? It is the purpose of this paper to give an answer to this important question. A proper compost in which to grow the plants is indispensable to success, and this should be composed of good yellow loam, plenty of well-rotted manure, a little peat, and some coarse sand.

In potting the plants the roots should have plenty of pot room, as the period of bloom is much longer than in the case of summer-flowering varieties, and the growth and blossom are both conducted under much more trying conditions; therefore, to allow the roots to become pot-bound during the time they flower is bad practice.

When the season is at all favourable, it is a good plan to plant out in the open air at the end of May, and lift and re-pot the first week in September, during which time they will have made free growth. It is necessary to stop the leading shoots about twice during the time they are in the open ground. After being potted the plants do best when stood in a cold frame or under a north wall, and should be shaded for a week or ten days, until well established.

It is obvious, as these Carnations flower during

the darkest and dullest months of the year, that some artificial heat should be necessary. Air they must have on all favourable occasions, and a winter temperature of about 60°. This is needful to growth and bloom, and with air judiciously admitted, the plants do not become drawn. Watering is also a matter of the first importance. They require a good proportion of moisture, as they have a heavy task set them. Care must be taken that the soil is moist not merely upon the surface, but to the bottom. When water is applied a good soaking should be given, and its temperature should not be below that of the house where the plants are growing.

Some helpful stimulant is of great service when they are coming into flower. The safest and most advantageous is liquid-manure applied once a week. Fresh cow-dung and soot are the best materials. In applying liquid-manure it should be in a clear state, and diluted according to its strength.

In the case even of the best-managed collections, green-fly will be certain to put in an appearance, and it is a very persistent pest. Fumigation with tobacco-smoke is perhaps the best remedy, but if necessary the plants should be dipped in a solution made of four ounces of soft-soap to one gallon of water, to which half-a-pint of tobacco-juice should be added, and the whole mixed well together.

The propagation of the Winter-Flowering Carnation is effected by means of pipings or cuttings, which can be taken and struck at any time. The best period to do this is in the months of January, February, and early in March. Eight or ten pipings can be put into a four-inch pot; a light, free soil should be used, largely of a sandy character, which should be pressed firmly about the pipings; they should then receive a sprinkle overhead, and be placed in a bottom heat of a temperature of from 60° to 70°. In three or four weeks they will be rooted, and should then be potted off singly into three-inch pots. When well established in a warm temperature, they should be gradually hardened off and shifted into larger pots to keep them growing.

Constitution and habit of growth are also important points which should be kept in view. If seed is sown in January in pots or pans and placed on a brisk bottom heat it germinates quickly. The plants, as soon as large enough, should be pricked off into shallow boxes, grown on into size in a gentle warmth, and as soon as they are strong enough they should be hardened off and planted out in a well-prepared bed in the open ground. Here they will put on a free growth, and if the forwardest plants be lifted and potted early in the autumn they will bloom during the winter.

A selection of twelve varieties is added for winter blooming :—

"Amethyst"—Crimson.

"Andalusia"—Primrose.

"Colour-Sergeant"—Scarlet.

"Helena"—Bright Rose.

"Midnight"—Very Dark Crimson.

"Miss Joliffe" (Improved)—Pink.

"Mrs. Lombard"—Deep Rose.

"Mrs. H. Grenfell"—Salmon Pink.

"Mrs. Moore"—White.

"Rising Sun"—Scarlet.

"T. W. Girdlestone"—Buff, Edged and Flaked Deep Red.

"Winter Cheer"—Bright Scarlet.

The Malmaison Carnations can be classed with the Tree or perpetual types, but they do not form such a good winter-flowering section as those just named. They may be best described as a spring and early summer blooming group. There are now several varieties classed under the head of Malmaison Carnations. Madame Arthur Warocque, Brilliant Scarlet Crimson, is a very fine variety and the most persistent flowerer. The Malmaison Carnations can be propagated similarly to the winter flowering section.

THE CULTURE OF WINTER-FLOWERING CARNATIONS.

By J. Jennings.

In giving my experience of the culture of the Winter-Flowering or Tree Carnation, I will first start with the cuttings, which should be quite healthy and not too long.

They should be inserted in large 60 pots about the middle of January, and the soil used should be half loam and sand, with a little cocoanut fibre and about a quarter of an inch of fine sand on the top. Be careful to let the cutting rest on the bottom of the hole. Afterwards place in a temperature of 60°, and if possible under "bell-glasses," as I find if they once droop they are much longer rooting, and very often they are dried up before they begin to callus. If bell-glasses are used, the moisture should be wiped from the inside occasionally (say once every other day), or the cuttings are apt to damp. When the cuttings have formed roots they should be left in the cutting-pots for a few days before potting into 60's.

The soil used should be loam and leaf-soil, with a good dash of sand to keep it open. When potted, place in the same temperature until rooted through

(that is, until the roots reach the side of the pot), then take them to a cooler frame, of a temperature say of 50° by day and 45° by night. They will then want little attention until the end of April, except careful watering and occasional fumigating to keep down green-fly—or, better still, looking carefully over with a small brush, as I find fumigation is sometimes dangerous to young, tender Carnations, especially when the plants are in frames, where you cannot judge the strength of the fumes.

About the end of April, shift them into 48-size pots—of course, taking care that they are clean. The compost used should be half loam, half leaf soil (a little peat may be added if heavy), and plenty of sand, with a good sprinkling of charcoal. (Cow-manure, if left until quite dry and then rubbed through a fine sieve, is a capital fertiliser.) When potted, place the plants in a cold frame close to the glass, and give plenty of air night and day, as Carnations do not like a close atmosphere.

After this they should not be watered for several days. Great care should be taken in the matter of watering, which I think is one of the principal secrets of success.

When the plants are well rooted, and about five inches high, they will require stopping. Some of the late-flowering varieties, such as "Sir H. Calcraft," "Bright Phœbus," "Juno," etc., will only

require stopping once, but other varieties perhaps twice. There is really no hard-and-fast rule to be adopted, for everything depends on the season; if the summer is hot they will be much earlier and require twice stopping; but in a dull, cold summer like the last, once will be sufficient. About the end of June they will require their final shift, which should be into pots of eight inches diameter inside measure. The same compost should be used as before, only add one part of some fertiliser to every hundred of soil. A good sprinkling of coarse bones is also useful, as it helps to keep the soil open, besides feeding the plant. Soot is also a good fertiliser for them, and I always put a fair sprinkling over the crocks in the flowering-pots; it also helps to keep out worms.

When potted, place in cold frames for a week or so, if possible; but if frames are not available it does not much matter—the plants can be placed in their summer quarters, that is, on beds of coal-ashes or boards (to keep the worms from entering the flower-pots). They will then want staking, using one stake and looping the plant up to it. I use three-feet sticks for the Tree Carnations, and two-feet for the more dwarfish varieties, such as Miss Joliffe.

About the middle of August the pots will be getting full of roots, and should be occasionally helped with some fertiliser.

During the summer they will require very careful watering and tying, with syringing twice a day, in favourable weather. The syringing will help to keep them free from green-fly, which is a great enemy to the Carnation.

At the end of September they must be placed in their winter quarters, which ought to be a nice light house, made perfectly clean—that is, well washed both inside and out. They should be fumigated directly they are put in it, and again just before they open their buds, which will be about the middle of October.

The buds will require thinning if large flowers are wanted, some of the varieties more than others. I generally leave from thirty to forty buds on each plant of the variety Miss Joliffe, which will open good flowers; but "Empress of Germany," "Juno," "Sir H. Calcraft," "Baronne de Rothschild," and such sorts, I disbud to two or three flowers on a stem. The temperature should be 55° by day and 50° by night, with a little air front and top at all times. Carnations ought never to be kept close; no matter what the weather may be, they ought always to have a circulation of air.

Last year I succeeded in flowering the pink and blush Malmaisons during the winter, and I have a beautiful lot in flower now, the 12th January. I have been cutting since October, and shall continue to do so until the end of July.

We grow about 1,200 Tree Carnations, 1,400 "Miss Joliffes" and 3,500 Malmaisons, and with the border Carnations we get a plentiful supply of Carnation flowers all the year round.

The following is a list of some of the best sorts that I know, and those that will give most satisfaction:—

"Sir Henry Calcraft"—Large Red.
"Empress of Germany"—White, striped Rose.
"Baronne de Rothschild"—Yellow, striped Rose.
"Guy"—Pure White.
"Sir Rivers Wilson"—White, very fragrant.
"President Carnot"—Crimson.
"Lucifer"—Scarlet.
"Winter Cheer"—Scarlet.
"Alfred de Rothschild"—Rose.
"Bright Phœbus"—Bright Scarlet.
"Mrs. Llewelyn"—Rose.
"Mrs. Moore"—White.
'Madame Ernest Bergman"—Fine Pink.
"Juno"—Rose.
"Loveliness"—Flaked pink and white.

CALENDAR OF OPERATIONS FOR TREE OR PERPETUAL FLOWERING CARNATIONS.

By James Douglas.

JANUARY.

Begin this month to take cuttings. The slender side-growths which may be obtained from the main stem are the best; slip them off with the fingers, and plant them with little other preparation except to remove the lower leaves. Plunge the pots of cuttings in bottom-heat in a forcing-house, and to prevent the flagging of the cuttings squares of glass may be laid over them, resting upon the ends of the labels which are used to distinguish the varieties. This prevents rapid evaporation, and is sufficient to keep the cuttings plump until roots are formed. The temperature of the forcing-house should be about 55°. Plant the cuttings firmly in sandy loam and leaf-mould; a thin layer of sand ought to be laid on the surface before putting in the cuttings. The soil should be kept moderately moist; if too dry the cuttings may dry up, and if too wet they may rot. Some varieties will form roots in three weeks or so, others will take six weeks or more; and as this difference exists it is best to put not more than one variety in a pot.

As soon as it is seen by the growth of the plants that roots are formed, remove them from the bottom heat to a shelf near the glass in the same house.

FEBRUARY.

Still continue to take cuttings for succession, treating them as advised for January; but as the season advances green-fly—a troublesome parasite—will appear. If this is on the cuttings, dip them in a solution made of three ounces of soft-soap dissolved in a gallon of warm rain-water, heated to a temperature of 100°. Let the cuttings, after being dipped, lie until they are nearly dry, and then wash in clean rain-water. The rooted cuttings on the shelf should be potted off singly in deep thumb-pots, and be re-placed again on the shelf, or at least near the glass in the same house.

MARCH.

Cuttings may still be put in, and in this month they may be struck in a hot-bed, as well as in the forcing-house; but the method of treating them is the same—they are more liable to damp off in the hot-bed, and require but very little water. All plants, as soon as roots are formed, may still be re-potted, and kept growing steadily in a light position. Potting-soil ought to be prepared for the young plants, which will be ready for re-potting into large sixties or small forty-eights

by the end of this month. Use three parts good, fibrous, yellow loam, one part leaf-mould, one part of decayed stable-manure, a little bone-dust and one part light, fibrous peat. Enough may be mixed now to last through the season. Good drainage is necessary, and as the material is made rather light, press the potting-soil well in with the fingers.

APRIL.

Still continue to pot-off rooted plants, and transfer those well established in the thumbs into sixties and small forty-eights. By the first week in this month the plants may be placed in an airy greenhouse, and near to the glass roof. The young plants may have become infested more or less with green-fly; in that case dip them in the soft-soap solution already described. Sow seeds either on the first of this month or from the middle to the end of March and treat the plants the same as the ordinary varieties of Carnations.

MAY.

There is now good growth in the plants, and the main object of the cultivator being to obtain sturdy, vigorous growth, air must be admitted freely; indeed, as soon as fine weather sets in, place the plants in cold frames, and take every advantage of the weather to remove the lights. There can be

no stated period set down for re-potting these plants, as there may be three months between the rooting of the cuttings. A careful, good cultivator will watch his plants daily, and re-pot any that need it, for if they become what gardeners call pot-bound, the chances are that a check will be given to them from which they do not speedily recover. During this month it is a pleasure to see the full development of the leaves, and, if the plants are free from parasites, their colour is a rich glaucous green. By the end of the month the lights may be removed from the plants night and day. Old plants that may have been turned out of the green-house should be planted against walls, well-exposed to the sun, to produce flowers in the autumn.

JUNE.

Still continue to re-pot the plants, using the potting-soil not so finely broken up for the larger ones. Be careful to secure good drainage in the flower-pots in which the plants are expected to flower, and place over the drainage some fibrous loam from which all the clay particles have been shaken out. This or some such material is necessary to prevent the soil from mixing with the drainage; if this happens the plants may not do well. Place the plants in an open position out-of-doors on a hard bottom of ashes. The ashes should be rolled or beaten down quite firmly. I

do not recommend plunging the pots. It is better that they should have some shelter from the north and east by walls or buildings, if possible; but they cannot get too much sunshine, and when they can be placed in a favourable position they make by far the best growth quite in the open.

JULY.

This is usually a hot month, and insect pests, both thrip and green-fly, may be troublesome. In hot weather syringe the plants every evening, and, if very hot and dry, in the morning as well. This will usually keep them clean if they were free from insects when they were turned out-of-doors. Re-potting the plants will not yet be finished; indeed, some of the later propagated stock may not yet be put out-of-doors, for I do not advise placing the small plants quite out in the open. All through the season watering requires to be done with care. When the plants have filled the pots in which they are growing pretty full of roots, water may be administered liberally; but just after re-potting, and before the roots have well run into the new soil, great care is necessary—the new material might become waterlogged, and the plants would fail to make strong, healthy growth such as is needed for the production of good flowers.

AUGUST.

All the plants should be in their flowering

pots by the end of this month, and those propagated early will form their flower-buds. As soon as these are well developed they may be put in the glass-house to open. At this season it is necessary to fumigate to destroy thrip that may be about the flower-buds. I have known Carnation flowers quite destroyed by thrip in the bud-state even before any colour could be seen. When out-of-doors the thrip are kept under by syringing. Under glass, fumigating with tobacco-smoke is best. This quite destroys some flowers—such as Pelargoniums—but Carnation and Picotee blooms are not injured by it in any stage of their growth.

SEPTEMBER.

The work of this month is much the same as that of August. The plants continue to form flower-buds, and by the end of the month should be under glass; and it will now be found that, owing to the propagation being spread over three months, there will be a good succession of bloom. Some of the later plants will not yet have formed flower-buds, while others will be in full flower.

OCTOBER.

During this month there will be plenty of flowers, and some varieties open kindly with but little assistance from artificial heat; others do not. Their best position is a light, airy structure near

the glass-roof. A span-roofed or half-span house is preferable to a lean-to, as the circulation of air is not free enough in the latter. A rather dry atmosphere is best, and a minimum temperature of about 55°. This we sometimes have without artificial heat.

NOVEMBER.

This month artificial heat is necessary constantly, and the minimum temperature should be kept up to 55°; but air must be admitted daily, except when dense, poisonous fogs hang over the houses. The Carnation loves fresh air, and should have as free an admission of it into the houses in which they are grown as it is possible to give them. Be careful with the water; see that no plants are watered unless they are well on the dry side. Use rain-water if possible, and rather warmer than the temperature of the house. Be careful not to spill water about. Some, otherwise good gardeners, do not seem capable of watering a plant without running half of it over the rims of the pots, and a waste of water is not all the mischief done by such carelessness.

DECEMBER.

During this month, as well as through the early months of the year, we look for a reward of weeks and months of incessant care, and well do the plants repay us by a glorious wealth of bloom. Nearly thirty years ago I tried to have Tree Carnations

in flower all the year round, and succeeded in doing so with twenty-five plants. We did not cut flowers every day it is true, but they were always there to look at! The same attention and similar treatment as in October and November, ever remembering that a damp, cold atmosphere is the worst for flowering-plants, and a warm, buoyant atmosphere, with air whenever it can be admitted, even if it be but a chink, is the best.

THE CARNATION AND PICOTEE.

A Retrospect.

By Rev. H. H. D'Ombrain.

Among the advantages of old age (and there are some, although you, my young Apollo, with your athletic limbs and ambrosial locks, may not think so) is that of being able to compare the progress or decadence, as the case may be, of anything wherein we may be interested. From the mighty things of an empire, down to the smallest matter that can engage our consideration, there is to oneself always matter of interest, and I believe in many instances to others also; and so, as I have been asked to contribute something to this little brochure, and as I could do nothing on the subject of "culture" compared with those "past masters" in the art who contribute to its pages, I may perhaps interest some of its readers if I take a retrospect running back over some sixty years.

I shall endeavour to keep clear of that which is said to be one of the failings of old age, the praising of the past at the expense of the present, like the two old men in *Punch* cowering over the fire and complaining that the coals do not give

out the heat they used to do when they were boys; nor, on the other hand, shall I run into the opposite extreme and praise everything because it is new.

My earliest recollections of these flowers were connected with the City of Dublin, where, sixty years ago, there was a little band of florists, whose names have long since faded from the memory of most, although I remember them as if they were of yesterday. By some of these, Carnations and Picotees were assiduously cultivated. The canons of taste were, with these Dublin florists, much more rigid than with those who lived around the great metropolis of London. It was on those lines my own taste was formed, and my assertion of them has often brought me into opposition with those who derided them as priggish and strait-laced; but to those lines the Dublin florists rigidly adhered. At that time the flowers were mostly grown in beds, and a cultivator who grew them as they are mostly now grown—in pots—was an exception.

That there was a good deal of enthusiasm amongst them may be gathered from the fact that one amateur, who I recollect had his garden at the Meath Hospital, paid two guineas for a pair of Twitchett's "Don John," which was to beat all the world in crimson bizarres. What earnest pilgrimages there were to see it when it bloomed! but somehow or other it did not come up to reputa-

tion. "Admiral Curzon" still held the field, and in a short time "Don John" passed out of existence.

Amongst the raisers of those days was one whose name still survives in our lists—Mr. Puxley. He was a Swansea merchant, and owner of smelting works, for when a copper mine was discovered at Castletown, Berehaven, in the County of Cork (or coast of Cork), of which Mr. Puxley and his connections became owners, the ore raised proved very valuable, and was sent to Swansea to be smelted. Mr. Puxley, moreover, was an enthusiastic florist, particularly devoted to the Carnation, and, finding the soil and climate of the South of Ireland suited them better than Swansea, he moved his plants there, and many excellent varieties were raised, some of which are still to be found in our lists.

Lancashire, however, was more especially the home of the florists, and most of the new varieties were raised there, while many came also from that enthusiastic grower and raiser, the Rev. Charles Fellowes, of Shottesham, whose flowers passed into the hands of that king of florists the late Mr. Charles Turner, of Slough, for distribution, and the collection there became the largest in the kingdom. No one who has ever seen his splendid collection can ever forget it. It still continues, and many are the pilgrimages made from all parts of the kingdom to see it.

For a number of years all the best collections have been grown in pots, and bloomed under glass. The Metropolitan Floral Society, which existed some twenty years ago, during its brief existence, tried to encourage shows, but without success.

The establishment of the Southern Section of the National Carnation and Picotee Society changed the face of things. For a few years it seemed as if its efforts, like those of other societies, would be unavailing; but then came an awakening of interest and the number of exhibitors increased. The energy and practical skill of Mr. E. S. Dodwell added a large number of fine varieties to the lists, especially in Carnations; and if anybody will look through such a catalogue as Mr. Charles Turner's, of Slough, it will be seen how largely the modern cultivator is indebted to Mr. Dodwell for some of his choicest gems; while a visit to the Drill Hall on the Exhibition day will show how much the Carnation and Picotee have gained in popularity.

It ought to be extensively grown in the neighbourhood of London, for it is one of those flowers which flourishes in large towns, as witness the beautiful collection grown by Mr. Ben. Simonite close to smoky Sheffield, where he has not only grown them in perfection, but has raised very fine seedlings.

It may be asked of me, What is your idea of the

flower itself, and the progress it has made during the time you have known it? A difficult question in some points to answer. There are some flowers which were known in those days which still hold their own, as, for instance, "Admiral Curzon," "Falconbridge," and "Lovely Ann," and I hardly think that in their respective classes they have been beaten; but, unquestionably, there is now a large number of first-rate varieties, and, generally speaking, greater vigour in the plants. I think this is to be expected.

I think that Picotees show a greater improvement than Carnations; the new sorts are, to my mind, more free from "bars" than the older ones; while the greatest progress has been made in what I think to be the most beautiful class—the rose-and-scarlet-edged section. The delicate and lovely edges of rose and scarlet are most attractive, and, as far as I recollect, in my younger days they were few and had not a section to themselves, but were classed under red edges; while now it has even been proposed to separate them still further, and make one class for "rose" and another for scarlet edges. The Yellow Picotee, too, has wonderfully advanced. I remember when they were few and small in size, when Barrard's "Euphemia" (which would now not be tolerated) was the chief flower of the class; but the seedlings raised by Mr. Douglas, Mr. Turner, and others have supplied us with several most

beautiful flowers in a most beautiful class. Another improvement has, I think, taken place—we are getting more flowers with long pods. For many years there was a great controversy between North and South on this point. The Northerners called many of the Southern flowers—owing to their excessive fulness—"mops," while the Southerners retorted that the Northern flowers were little better than "singles." A compromise seems now to be effected, and the same flowers are equally favourites in both North and South.

"Border Carnations" is now the cry, and selfs and fancies are very popular. I do not decry the border varieties, for they are very beautiful and very sweet, but I only express the fear that they may lead people to neglect or slight the more refined and delicately marked florists' varieties, for *they* do not make such a display of bright colours for the mixed border.

The act of looking back on these reminiscences of bygone days has an element of sadness in it but I cannot forget how many pleasurable days one has enjoyed amongst these favourite flowers, and I can only hope that the present effort may still further tend to extend the cultivation of a flower which has so much to recommend it to all lovers of a garden.

DISEASES AND PESTS.

By Martin Rowan

Of the diseases troubling the Carnation there are the gout, as it is called, and spot. The former, which shows itself first in a swelling, and often results in the rotting away of the stem of the plant, seems to be engendered in the first instance by rank sappy growth acted on, it may be, by the winter frost, or, what is probably more common, a rank growth forced on by a high temperature, in early summer, has encountered a check through a change to colder weather which its original unhealthy state has rendered it unable to withstand. A well-drained soil for the border plants, and plenty of air during the winter for the plants in the frames, once they are properly established, are the best preventives of either of these diseases. Light and air are alike the preventive and the cure for spot. Young plants showing symptoms of gout I pot in pure sweet loam, with which is mixed a little coarse silver sand and some lime rubbish, all manurial matter, even leaf-mould, being excluded. A little watchfulness and care as to the watering will, if the disease has not

gone far, bring the plant gradually into sounder growth and healthy layers may be obtained, and the stock saved. In the case of older plants where the disease has become developed, the layers should be put down as early as possible, and severed immediately they are found to be rooted, and in bad cases the sound shoots can be taken off and be planted as cuttings. I have at present nothing so hard and sound as "Favourite" (light scarlet-edged Picotee), the plants of which when received some years ago were decidedly gouty.

Green-fly will not generally be troublesome where plenty of air has been given to the plants in the frames during the winter, but in some seasons it is more prevalent than in others, as in the May of 1890, when in the universal check resulting from cold frosty nights following the hot drying days of that month, the very trees were seen covered with it. Soft-wooded plants exposed to the same conditions may be trusted, at such times, to come in for their full share of this pest. It must then be dealt with by the application of a weak solution of soft soap, or by dusting the plants with tobacco powder, either of which should be syringed off again. If the plants are only affected here and there slightly, the fly may be removed by a camel-hair brush.

Spittle-fly must be watched for and instantly removed or the plants will be crippled and

spoiled for flowering. I have already alluded to the necessity of searching for wire-worm in the soil before planting or potting, but by far the worst enemy with which we have to deal is maggot. I am persuaded that this pest has had more to do with the neglect of the Carnation, of which we often hear, than any other cause. It is a small white grub, said to be that of the saw-fly, and mostly prevalent in cold and moist seasons. The fly deposits its eggs sometimes in the leaves, raising a whity-brown patch like a blister. In such cases the affected parts have merely to be cut off and destroyed; but it also lays its eggs in the stem, and the grub is developed there without previous warning, often working its way into the heart of the plant before its presence is suspected. When it is present, the centre of the plant has a pallid, sickly appearance, often thought to be caused by the excessive moisture of a wet season, and after a time the heart of the plant is seen to drop completely out.

Careful observation will, in the majority of cases, enable the grower to detect the sign of maggot in the plant in time to pick it out with a needle or similar instrument before it gets far enough into the heart of the plant to eat it out. In too many cases it eludes all vigilance till the mischief is done; it does not always kill the plant, but a plant with the centre eaten out is spoiled for

flowering, and so maimed that it is only worth while in the case of a very scarce variety even to keep it for stock. One finds maggot at all seasons, but principally in the autumn and winter. It is most prevalent in cold, moist seasons; thus in 1886 we were overrun with it, in the long dry season of 1887 it was wholly absent, while again in the wet season of 1888 whole beds were destroyed by it. In my experience—and I have been told the same by other growers—it is far more prevalent among the plants in the borders than among those in pots, where we get it very partially, and it is confined, in fact, to particular sorts, like certain of the Rose Flakes, some of the Purple Flakes, and Pink and Purple Bizarres (Wm. Skirving especially among the latter), which have a tendency to succulent growth.

The worst affected are the common Clove, Souvenir de la Malmaison, and, as already said, some of the Rose Flakes and Pink and Purple Bizarres. From this it would seem that the softer or more succulent the growth, whether such be the habit of the variety, or the effect of gross culture, the more likely it is to be selected by the fly for the deposit of its eggs. Our means, whether of cure or prevention of this pest, are thus only partial, and we can but apply them such as they are.

Earwigs are particularly troublesome when the

plants are about to flower, and in the case, at all events, of blooms meant for exhibition, these insects must be diligently trapped and destroyed. Caterpillars are also very voracious about this time, with a distinct preference for the buds. When any signs are seen of their presence they must be hunted for till found, for even one of these male-factors if left undisturbed will do deplorable damage among the flowers between night and morning. They are most likely to be caught at their depredations by the aid of a lantern at night-time.

It is sad to have to include among Carnation pests that time-honoured pattern of thrift and industry—the busy bee; but it is useless to disguise the fact that he is among the most troublesome we have to contend with, destroying as he does for the exhibitor any bloom on which he is allowed to settle, and upsetting equally the best laid plans of the seedling-raiser by his operations. Bees must be kept out of the house as far as possible by means of muslin or gauze placed over the openings. From the flowers under canvas it is more difficult to exclude them, and in spite of all watchfulness they will take toll of many a fine bloom.

Among the larger pests, rabbits and hares, which are so dearly fond of Carnations as to eat them bodily, are only likely to trouble the suburban grower who is located near the country; but there

is the sparrow who is always with us, and who in cold, dry winters and springs loves to nibble the plants as they begin to put forth growth. A few lines of thread run crosswise above the plants will effectually keep him off. Where the plants have been so nibbled, the worst that happens seems to be that they bloom rather later than they would otherwise have done, but they are sorely disfigured for the time, and it is well, in any case, that the enemy should be scared off.

Suburban gardens are commonly the undisturbed and happy hunting grounds of every enemy to the flowers. Constant exercise of cleanliness and the burning of dead leaves, and all refuse and decayed matter, thereby destroying our foes *ab ovo*, is the way the war must be carried on against them.

DISEASES AND FOES.

In a manual upon the Cultivation of the Carnation it is necessary to deal with the diseases to which it is subject, and the foes to whose attacks it is specially liable.

It is well, however, to preface our remarks upon diseases by stating that it is the experience of most growers that there is nothing to be done with a Carnation badly diseased but to pull it up and burn it.

If, however, a valuable or scarce variety is only partially affected, it may be possible to take off healthy portions of it, and strike them as cuttings, or to cut away the diseased portions, and at once layer the healthy shoots.

Fortunately the diseases affecting Carnations are few in number.

Two fungoid growths specially attack them: *Helminthosporium echinulatum*, and *Uredo dianthi*.

The first, *Helminthosporium echinulatum*, was minutely described by Mr. Worthington G. Smith in the *Gardeners' Chronicle* for August 21st, 1886, and we have been kindly permitted to make extracts from his letter and to reproduce for the

benefit of our readers the woodcut that accompanied it. He says:—

"During the last few years a destructive brown mould has been very common on Carnations, in bad cases whole collections have been destroyed. The name of the fungus which causes the mischief is *Helminthosporium echinulatum*, and its external appearance is shown, natural size, on the upper part of the accompanying illustration. (*See* Fig. 1.)

"The fungus was first described, with a small illustration, by the Rev. M. G. Berkeley in the *Gardeners' Chronicle* for March 19th, 1870, since which time the attacks of the parasite have greatly increased both in frequency and intensity. The superficial appearance of the fungus, as it grows on both sides of the leaf, is very distinct, and may be immediately recognised by its correspondence with the accompanying figure.

"As the fungus vegetates between the two membranes of the leaf, it cannot be reached by any sulphuring process without destroying the leaves. The only mode of action that can be taken therefore against the fungus is to carefully pick and *destroy* every infected leaf."

We do not think it necessary to give in detail the description of this fungus, as revealed under the microscope, and given by Mr. Worthington G. Smith to the scientific world, and will only attempt

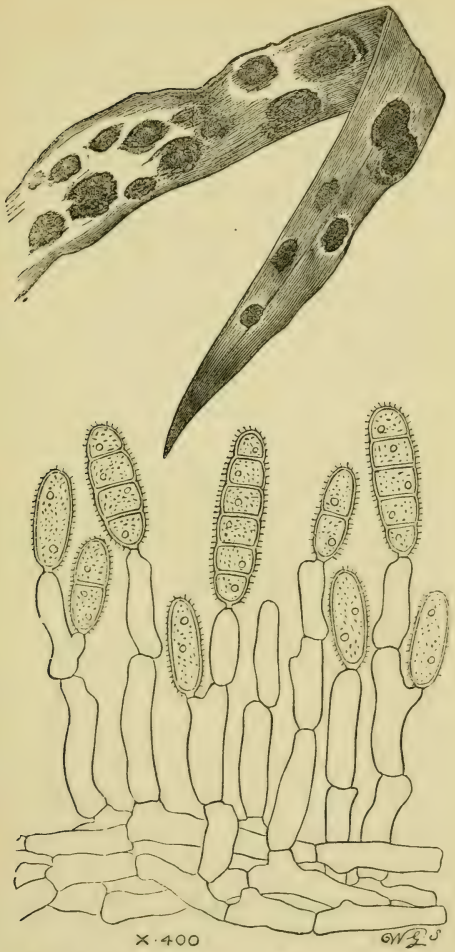

Fig. 1.—Helminthosporium Echinulatum.

Diseased leaf, natural size. Specimen of fungus magnified 400 diameters.

to describe its appearance to the eye, or under an ordinary magnifying glass.

The illustration given may lead some readers to suppose that the appearance of this fungus has something in common with that of *Uredo dianthi* or the well-known Carnation "Spot."

There is, however, no possibility of confounding the two. The colour alone of the Helminthosporium is sufficient to identify it.

Its first appearance is indicated by a small livid protuberance, not perhaps a thirtieth of an inch in diameter, like a little boil or blister. This rapidly assumes the appearance of a small dark spot, which might escape any gardener's attention. When examined, however, with a strong magnifying glass, it will be found that the boil has burst across, and is full of myriads of small chocolate-coloured spores which are rapidly dispersing round the protuberance. This may now well be likened, in extreme miniature, to the fungus everyone has seen in meadows, commonly called "a powder puff."

The mischief rapidly spreads into patches, generally of oval form, covering, perhaps, the whole width of the leaf. These are, however, by no means necessarily oval in form. We were examining but a few days since some specimens which had spread about the leaf in irregular shapes of no describable form.

The colour (chocolate) and the visible palpable

dust (the spores) which can be wiped away, distinguish this disease, even under very superficial observation, from the far commoner Carnation "Spot."

This chocolate-coloured dust falls upon the surrounding foliage and rapidly and destructively spreads the disease. In addition, therefore, to cutting off all infected leaves and burning them at once, it would be advisable to sponge the foliage of all plants in the vicinity with some weak antiseptic solution. Dilute carbolic acid, mixed according to directions, is said to be a specific.

Mr. Charles Blick, gardener to Martin R. Smith, Esq., states that he had a whole house of "Malmaison" Carnations infected badly with this disease in January, 1891, but that he ultimately got rid of it by persistently sponging the plants with a weak solution of Gishurst's compound. The plants regained their wonted vigour and flowered well.

The disease would appear to be one that can be readily got under if discovered at an early stage, and treated with patient and persistent attention.

The other fungoid disease we have mentioned, *Uredo dianthi*, is better known to all growers of Carnations under the familiar name of "Spot." Its appearance is unfortunately so well known that it requires no description here.

The consensus of opinion received from practical gardeners leads to the conclusion that it is

attributable to a damp and stagnant atmosphere, to sodden or unsuitable soil, to severe check or chill, or to the overcrowding of plants. Certainly it is rapidly developed under any and all of these conditions, and hitherto no application has been discovered which can be said to be a cure for it. It certainly affects some varieties much more than others, and it is difficult authoritatively to state that it is infectious, for healthy, vigorous plants will stand in actual contact with the disease without becoming infected by it. It would, however, be most unwise to rely upon such immunity.

If the plants affected are in the open border they must take their chance, for there appears to be no remedy at present known for the disease. If they are attacked late in the autumn when no further growth is to be expected, there is nothing to be done but to cut off the diseased foliage and burn it at once, and to keep the soil round the plants well stirred. If they survive the winter, and once begin to make growth, the disease may disappear as mysteriously as it originated.

If the affected plants are in pots, the only remedy is to give them as much light and air as is possible, cutting away the diseased leaves, and in extreme cases to put them into a warm, dry atmosphere and force them into growth. The disease appears to be most troublesome in wet, cold seasons.

A, is a diseased Carnation attacked by *Tylenchus*. B, is a leaf cut transversely through, and magnified ten diameters. The worms are to be seen amongst the intercellular spaces of the substance of the leaf as illustrated; and in some instances the eggs of the worms will be seen just within the skin, as shown at B. At D is seen a fragment of the diseased Carnation leaf, magnified eighty diameters, with the worms still within their eggs, emerging from them, and quite free, the worms are seen coiled up within the semi transparent eggs at the bottom of the illustration at D; the common cells of the plant are seen on the right and left, with vessels belonging to one of the leaf veins at E. C and E are nematoids of the Cucumber disease to the same scale for comparison.

These two fungoid diseases are those by which the Carnation appears to be most frequently affected.

We come now to an entirely different form of disease, caused by minute nematoid worms, which produce the appearance in the plant known as "gout." The scientific name for the worm is *Tylenchus*, and among gardeners they will be better known as "eel worms."

This disease was exhaustively described with illustrations by Mr. Worthington G. Smith in the *Gardeners' Chronicle* of Dec. 3rd, 1881, and by his kind permission we give the following extracts from his letter:—

"The symptoms of this disease in Carnations are manifested by large whitish or livid patches on the leaves, chiefly at, or near, the collar or crown of the plant. At times these patches are higher up on the leaves (see illustration on opposite page).

"The worms are, no doubt (as suggested by Mr. Berkeley), derived from the soil. They appear to attack the collar of the plant, and at this position get inside; here they lay their eggs, which, when hatched, produce their worms, and these different generations of nematoids eat their way upwards inside the leaves, and their presence, of course, causes the dead and livid patches mentioned.

"Burning the plants is generally recommended as the only means for the extirpation of the nematoids,

and, no doubt, this is the best plan with already ruined plants." The soil round the plants should also be removed.

No remedy has yet been found to destroy the worms when once they have effected a lodgment in the plant; but in the soil they are readily destroyed (as seen under the microscope) by the application of some caustic material.

The following remarks have been sent to us by Mr. Martin R. Smith, upon the subject of the Carnation Maggot, which is the larva of a dipterous fly called *Hylemia nigrescens*.

THE CARNATION MAGGOT.

Hylemia nigrescens.

This is certainly one of the most troublesome and destructive foes of the Carnation, inasmuch as no precautions at present known to gardeners will prevent its attacks, and nothing but patient and persevering attention will avail to get rid of it.

It attacks all Carnations indiscriminately, though certainly some varieties are freer from it than others, and layers from plants cultivated in the greenhouse are, as a rule, less infested with it than those from the open border.

It is a small yellowish-white maggot, varying in size from a twentieth to one-third of an inch in length. It appears to spring from an egg laid on or in the leaf, generally towards the upper end,

and is mainly observable in layers or seedlings, for after the plant has attained a certain age it appears to enjoy a comparative immunity from its attacks.

The maggot works its way down under the outer skin of the leaf until it finds its way into the shoot, and down this it steadily eats until it reaches the main stem of the plant, into which it bores, and, eating out the very centre of the stem, eventually kills the plant.

There is no simple means of dealing with these pests—no dressings or solutions will touch them, and they must be patiently followed, hunted down and destroyed. The only necessary adjuncts are a sharp narrow pointed knife, and a long pin—say a gunpick from a knife.

It is not altogether a simple matter for an uneducated eye to detect the presence of this maggot, for *it does not kill the shoot* down which it is burrowing its way. The surest indication of its presence is a whitish-brown track down the leaf betraying the path it has taken. If the crown leaves of the shoot in which this sign is visible be given a slight pull, they will probably come away in the fingers, though apparently green and flourishing. The shoot must then be taken off at its first joint, and examined; if sound, the maggot is in the part pinched off, but if, as is more than likely, a small hole in the shoot is observed, the maggot has passed on, and must be followed.

When the shoot is pulled off the main stem a very small clean cut round hole will be often found in the stem, and through this the maggot has passed, and is certainly snugly lying in the heart of the plant. Your knife will soon tell you in which direction he has travelled; and the stem must be cut open, without a thought as to whether the plant will survive the operation or not: for if you catch and kill the maggot the plant *may* live, even though sorely crippled; if you do *not* catch him the plant will certainly die.

Sometimes—as often as not—the first evidence of the maggot is seen in the crown leaves of the main shoot. When this is the case the plant must be ruthlessly pinched back until he is secured. There are occasionally two working amicably together, so when the pin has extracted one it is well to make sure that there is not another left. They can often be got out with the point of the pin without breaking off the shoot.

If the plants are carefully watched, the maggot should be caught before he gets to the main stem. When once he has established himself there the plant has but a poor chance.

In looking over the plants it must not be forgotten that a mere superficial glance is not enough. Every pot must be taken in the hand and all the young shoots observed, and even a gentle pull given to them. This latter precaution will often detect

the presence of the enemy, when the eye has failed to discover him.

After a time the maggot turns into a chrysalis; his power for mischief is then at an end, and many plants are thus saved.

The most important point of all is to catch him in the leaf before he gets into a shoot, but to do this requires an amount of care and time which few persons are able to bestow.

When plants are found to be infested with them they should be gone over daily until the plague is stayed.

When in the leaf, before they have got into a main shoot, they are so small as to be scarcely visible.

Wireworms.—These are well-known enemies of the Carnation and Picotee; and are well known to gardeners under this name. They are the larvæ of certain beetles belonging to the family *Elateridæ*. The beetles are known under the popular names of the Skipjack, Snap Beetle and Click Beetle. The most hurtful species are *Agriotes lineatus*, *A. obscurus* and *A. sputator*. The beetles themselves are quite harmless; but the damage done by the larvæ is beyond computation. In the larval condition they remain in the ground for a period of from three to five years. A full-grown specimen of the larvæ is about an inch in length of a clear brownish-yellow colour. The skin is smooth,

tough and hard, and feels between the finger and thumb like a piece of wire. They are most difficult subjects to deal with, feeding as they do near the surface of the ground, but always concealed under it. They eat a hole into the centre of the Carnation stem immediately below the surface of the ground, and eat downwards or upwards. The cultivator has no idea what is taking place until the plant begins to shrink or shrivel up; and if the stem is examined below the surface the depredator may be caught in the act; too late, indeed, to save the plant, but in time to prevent the same wireworm from doing any more mischief. Many remedies have been given to destroy them, but it is too late to apply them after the Carnations have been planted out. I believe the best is to put on a good coating of gas-lime, fork it into the ground, and let it lie fallow for a year, frequently stirring it over with a fork or hoeing it deeply. If wireworms show themselves in a bed of Carnations, place thick slices of carrot on the end of pointed sticks; bury the slices two or three inches under ground and examine them daily; the wireworms will be found feeding on the carrot slices and can be destroyed. The potting soil for Carnations should be thoroughly examined before using it. The worms are easily detected in it.

Aphides, or "Green Fly," as they are termed, belong to the order *Hœmoptera*. The Carnation

grower will soon become acquainted with them; they are most hurtful to plants grown under glass. The insects are of small size, green and very soft, so as to be easily crushed with the fingers; they cluster in large numbers on the ends of the young growths, where they soon cripple the plants, and would, if undisturbed, render them worthless. They increase with the most marvellous rapidity. The insect deposits its eggs on the leaves of the Carnation in autumn, and these are hatched with the warmth of spring. The produce of these also deposit eggs which are speedily hatched. In hot weather the insects become viviparous, ejecting young insects instead of eggs at a rapid rate. They may be destroyed by tobacco-smoke if the plants are under glass, or tobacco-powder when they are out of doors. A solution of soft-soapy water, two ounces to the gallon, will kill them, if the plants are dipped into it.

In using any mechanical means to brush the fly off the plant, care must be taken not to crush the insect, as the acrid juices contained in them injure the plant materially, and a young shoot from which the fly has been roughly removed, say with the fingers, will henceforward afford by its injured and diseased appearance evidence of the fact.

Thrips.—This is a genus of small lively insects well known to cultivators of Carnations for ex-

hibition. There are many species of thrips not easily distinguished the one from the other; but the species mostly found upon Carnations is *Heliothrips hæmorrhoidalis;* it finds its way into the flower-buds before they open, and feeds upon the petals. In hot seasons, if the plants are neglected, they become so numerous that they may be shaken out in scores and hundreds into the palm of the hand. The only way to keep them down is to thoroughly syringe the plants daily in the bud state; and the buds may be dusted when wet with fine tobacco-powder. Plants in pots may be taken into a greenhouse and well fumigated with tobacco smoke. The fumigation does not injure the buds or open flowers of the bizarre and flake Carnations, or the Picotees. This troublesome pest does the most mischief in hot, dry seasons.

SELECTION OF VARIETIES.

The leading cultivators of the Carnation and Picotee having been invited to send in lists of those varieties in the several classes which they consider the best, the following table has been compiled from these lists showing the number of votes given to each variety. The following are the names of cultivators who kindly supplied lists:—

Mr. Charles Blick.
„ Geo. Chaundy.
„ Richard Dean.
„ Jas. Douglas.
„ T. E. Henwood.
„ Fred. Hooper.
„ J. J. Keen.
„ H. W. Headland.
„ Joseph Lakin.
Mr. Chas. Phillips.
„ J. Rebbick.
„ Martin Rowan.
„ Ben. Simonite.
„ J. P. Sharp.
„ Robert Sydenham.
„ J. Walker.
„ W. L. Walker.

Five persons did not give lists of border varieties, and two did not give lists of yellow-ground Picotees.

CARNATIONS.

Scarlet Bizarres.	Votes.	*Crimson Bizarres.*	Votes.
Robert Houlgrave	17	Rifleman	16
Robert Lord	17	Harrison Weir	15
Admiral Curzon	15	Master Fred	14
George	12	J. D. Hextall	14
C. H. Herbert	9	Joseph Lakin	7
Fred	6	Edward Rowan	6
Mars	5	J. S. Hedderley	5
Joseph Crossland	5	John Simonite	4
Arthur Medhurst	5	Duc d'Aumale	2

CARNATIONS (*continued*).

Pink & Purple Bizarres.

	Votes.
W. Skirving	17
Sarah Payne	17
Mrs. Barlow	10
H. K. Mayor	8
Squire Llewelyn	7
Miss Annie	4
Unexpected	4
Sir Garnet Wolseley	3
John Harrison	3

Purple Flakes.

	Votes.
Jas. Douglas	17
George Melville	14
Gordon Lewis	11
Mayor of Nottingham	10
Florence Nightingale	10
Squire Whitbourn	6
Prince George of Wales	6
Oscar Wilfred	4
Sporting Lass	2

Scarlet Flakes.

	Votes.
Sportsman	17
Matador	17
Alisemond	15
H. Cannell	13
John Ball	7
Clipper	5
Cannell Junior	4
Tom Lord	3
Richard Dean	2

Rose Flakes.

	Votes.
Thalia	17
Sybil	16
Rob Roy	12
Crista-galli	9
Jessica	7
Lovely Mary	7
John Keet	5
Tim Bobbin	4
Jas. Merryweather	4

Selfs.

	Votes.
Germania	12
Purple Emperor	9
Mrs. Reynolds Hole	9
Mrs. Muir	8
Joe Willet	7
Rose Celestial	6
Emma Lakin	5
Governor	4
Mrs. Fred	4
Annie Lakin	4
Vice President	3
Ruby	3
Hebe	3
Mary Morris	3
Gladys	2
Blushing Bride	2
Aureola	2
The Moor	2
Theodore	2
Medora	2
Pride of Penshurst	2
Lady Gwendoline	1
Rosalind	1
Neptune	1

PICOTEES.

Heavy Red-Edged.

	Votes.		Votes.
John Smith	16	Princess of Wales	8
J. B. Bryant	15	Mrs. Dodwell	7
Brunette	14	Morna	6
Dr. Epps	13	Mary D. Anstiss	3
Isabel Lakin	9		

PICOTEES (*continued*).

Light Red-Edged.

	Votes.
Thomas William	17
Mrs. Gorton	17
Violet Douglas	17
Mrs. Bower	11
Emily	7
Lena	4
Elsie	2
Laura	2
Grace	2

Heavy Purple-Edged.

	Votes.
Muriel	16
Mrs. Chancellor	15
Zerlina	14
Amy Robsart	11
Calypso	6
Amelia	5
Alliance	2
Lizzie Tomes	2
Mrs. Niven	2

Light Purple-Edged.

	Votes.
Ann Lord	16
Clara Penson	15
Mary	13
Baroness Burdett-Coutts	7
Nymph	7
Silvia	6
Elizabeth	6
Juliette	5
Her Majesty	3

Heavy Rose-Edged.

	Votes.
Mrs. Sharpe	17
Mrs. Payne	15
Edith D'Ombrain	12

Heavy Rose-Edged (cont.).

	Votes.
Royal Visit	8
Lady Louise	7
Lady Holmesdale	6
Norman Carr	5
Little Phil	5
Fanny Ellen	4

Light Rose or Scarlet-Edged.

	Votes.
Favourite	17
Nelly	15
Ethel	15
Mrs. Ricardo	9
Orlando	6
Miss Wood	4
Rosemary	3
Evelyn	3
Daisy	2

Yellow Ground.

	Votes.
Annie Douglas	12
Agnes Chambers	11
Mrs. Henwood	10
Almira	10
Countess of Jersey	8
Lilian	7
Prince of Orange	7
Romulus	6
Mme. Van Houtte	6
Victory	6
Mrs. Walford	6
Colonial Beauty	5
Terra Cotta	5
Mrs. R. Sydenham	4
Tournament	4
Stradraith Bail	4
Lord Rendlesham	3
Dorothy	3

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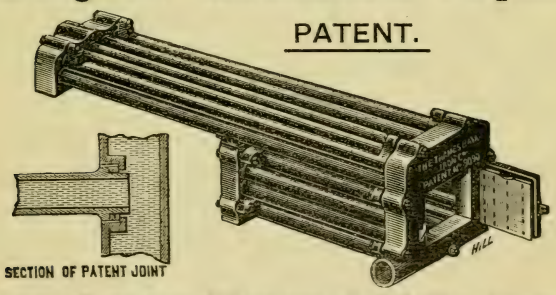

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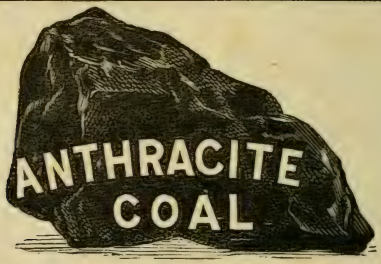

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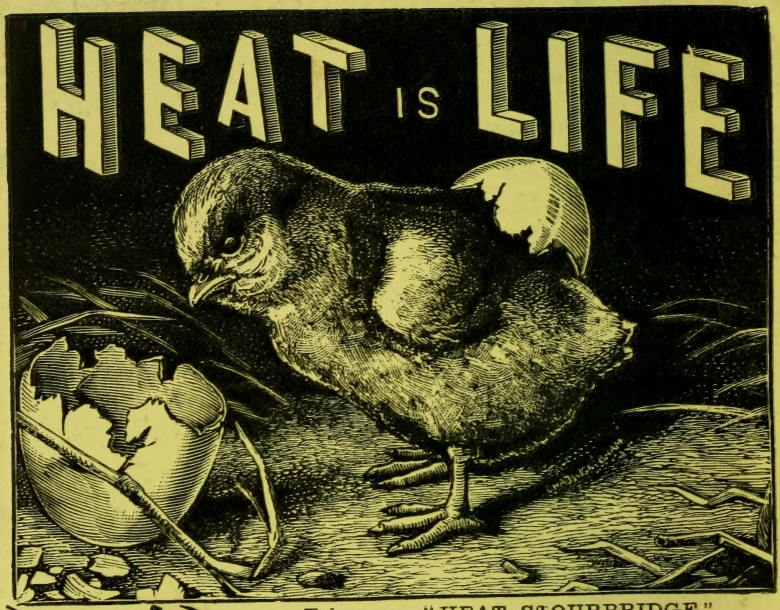

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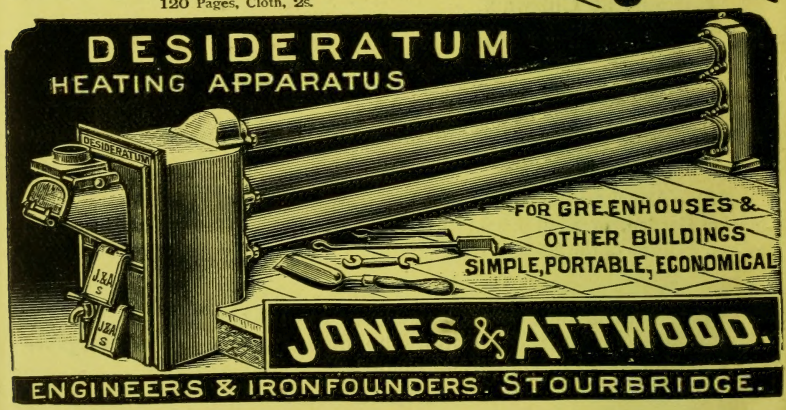

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